THE AMERICAN GAS LIGHT JOURNAL

PUBLISHING OFFICE No. 42 PINE STREET

DEVOTED TO THE INTERESTS OF ILLUMINATION, HEATING, MECHANICAL, CHEMICAL AND GENERAL SCIENCE.

VOLUME LXXXVIII., No. 16. Whole No. 1,715. | NEW YORK, MONDAY, APRIL 20, 1908. | $3 PER ANNUM, IN ADVANCE.

A. M. CALLENDER & CO., Proprietors. | THOMAS J. CUNNINGHAM, ELBERT P. CALLENDER, Editors.

ENTERED AT THE POST OFFICE AT NEW YORK, N. Y., AS SECOND-CLASS MATTER.

Published on each Monday of the year, at No. 42 Pine Street, New York.

Telephone.—2996 John.

Terms of Subscription, Including Postage.—For the United States, $3; Canada, $4 per annum. European countries, $5 (£1—25 francs).

Remittances should be made either by post office order, express money order, registered letter, or bank draft on New York, payable to the order of A.M. Callender & Co.

Correspondence.—Wishing to make this JOURNAL a gazette of intelligent discussion to those of our readers who may wish to gain or give information on the subjects to which its columns are devoted, correspondence is solicited for publication from all who make the study of those subjects a pleasure or a profession.

Collections are invariably made directly from this office for subscriptions, advertisements, etc. We have agents to solicit the same, but they are not authorized to receipt for money.

Indexes for the previous 6 months will be found in the First number of July and the First number of January.

The American News Company, Nos. 39 and 41 Chambers street, New York, are agents for this JOURNAL. Newsdealers will send orde to them All payments to be made in advance. Single copies, 10 cents.

The Public Lighting Tables of the American Meter Company will be found in the page advertisement of that Company.

CONTENTS.

An Asterisk (*) denotes an illustrated article.

OFFICIAL NOTICE—
Wrinkle Department, American Gas Institute..... 661

NOTICE—
Third Annual Meeting, Natural Gas Association..... 661

EDITORIALS—
Briefly Told..... 662
Tungsten-Night, New York Session, Illuminating Engineering Society—April Meeting, New England Section Illuminating Engineering Society—The Gas Engineering Course, Sibley College—Current Comment.

Thirty-eighth Annual Meeting, New England Association of Gas Engineers—Official Report—Continued from page 626..... 663
First Day, Afternoon Session—Discussion on Tar—More Questions—Second Day, Morning Session—Report from Nominating Committee—Election of Officers—Some Responses—Report of Committee on Uniform Accounting and Depreciation—A Reinforced Concrete Oil Tank Building: Design, Maintenance and Cost, by Mr. Charles F. Leonard—And a Supplement Thereto, by Capt. McKay—Discussion—Maintaining Mantle Lamps, by the Secretary—Discussion.

Public Service Commissions, by Mr. C. H. Dickey..... 670

*A New Type of Gas Heater, by Mr. E. S. Bradburne..... 671

On the Recovery of Cyanogen Compounds in the Distillation of Coal and the Disposal of Effluents from Ammonia Stills..... 672

*An Improved Hygrometer for Determining the Minimum Temperature of Gas in Distribution Mains, by Mr. C. C. Tutwiler.... 672

ITEMS OF INTEREST FROM VARIOUS LOCALITIES..... 674
Lower Rates, Beverly, Mass.—Personal—For Account Sinking Fund—Proposing a Gas Plant for Northfield, Minn.—Two Personals—Mr. Rancke "Goes Further South"—Mayor Avery Frees His Mind—There Were no Applicants—Receiver Pepper's Last Statement—Earnings at Grand Rapids, Mich.—A Compliment to Mr. Horton and His Company—Lower Rates, Willimantic, Conn.—Trouble at Paulsboro, N. J.—Two Annual Meetings—"What do you Think of This?" Kingston not over Pleased—Annual Meeting, U. G. I. Co.—Manager Nevins Still on the Hunt—A Decision—And Other Items.

The Market for Gas Securities..... 676

[OFFICIAL NOTICE.]

Wrinkle Department, American Gas Institute.

To the Members of the American Gas Institute: All members of the Institute are earnestly requested to send in as soon as possible contributions for this year's Wrinkle Department report. The success of the Department depends entirely on the co-operation and assistance of the members.

Mail all contributions to Milan R. Bump, Editor, No. 40 Wall street, New York city.

[NOTICE.]

Third Annual Meeting, Natural Gas Association of America.

OFFICE OF THE SECRETARY, KANSAS CITY, MO., April 6, 1908.

To the Members, Natural Gas Association of America: Gentlemen—The third annual meeting of the Natural Gas Association of America will be held in Kansas City, Tuesday, Wednesday and Thursday, May 19th, 20th and 21st. The following papers will be read:

"Geology Relative to Natural Gas," by Mr. F. H. Oliphant.

"Transportation of Natural Gas," by Mr. Wm. M. Welsh, Chief Engineer Kansas Natural Gas Company, Independence, Kas.

"Method of Distribution Management," by Mr. James Strickler, City Superintendent, Columbus, O.

"Field Operation," by Mr. Walter McClay, General Superintendent, Philadelphia Company, Pittsburgh, Pa.

"Methods of Accounting," by Mr. W. R. Hadley, Pittsburgh, Pa.

"Installation of Distribution Systems," by Mr. John B. Klumpp, U. G. I. Company, Philadelphia, Pa.

Other papers, the Question Box and Wrinkles, are in the course of preparation, and announcement of the titles of the papers will be made later.

For the entertainment of the delegates outside of the business meetings, arrangements are in the hands of an Entertainment Committee for visits to various parts of this very interesting city, and for a banquet on Thursday night. There will also be trips of interest; and a theater party for the ladies. The business meetings and the banquet will be held on the roof garden of this hotel. It is suggested that reservations for rooms be made at as early a date as possible.

It has also been determined to take the entire ground floor of a building immediately south of the Savoy Hotel, which will be the headquarters of the Association for the purpose of demonstrating various appliances for using natural gas.

This room is large, well lighted, well ventilated and readily accessible, not only to the members of the Association, but also to the public. As the building is piped the various appliances exhibited can be shown in actual operation. Manufacturers of appliances wishing to make a

LIBRARY OF CONGRESS, APR 20 1908, SMITHSONIAN DEPOSIT.

demonstration thereof may obtain any necessary or desired information concerning this display by applying to Mr. R. O. Fritz, 2012 Baltimore avenue, Kansas City, Mo. Yours very truly,

J. H. DUNKEL, Secretary.

BRIEFLY TOLD.

TUNGSTEN-NIGHT, NEW YORK SESSION, ILLUMINATING ENGINEERING SOCIETY.—"Tungsten-night at the Illuminating Society would have been a happy name for the last meeting of the New York Section, which was held the 9th inst. Ostensibly, Dr. Clayton H. Sharp was to read a paper upon 'The Newer Electric Incandescent Lamp,' but before the evening was completed it became evident that the arch point of interest was the most efficient form of electric incandescent lamp produced so far for commercial purposes. Dr. Sharp spoke extemporaneously, but with such clearness and in a manner so direct and forcible, as to delight his hearers. His historical resume contained a mine of information, the most notable points being the description of six methods of preparing tungsten for use as a filament, and that purchasers often did not receive tungsten lamps, even when they paid for them, owing to the difficulties in removing the binder and other impurities. A number of slides giving relative performances under test, showed that life and candle power of tungsten were less affected by changes in voltage than any other incandescent lamp. Through the courtesy of the New York Edison Company, the General Electric Company and the Westinghouse Lamp Company, an exhibit of incandescent lamps completed the 'talk.' A number of reflectors were included in the exhibit, and it may be interesting to note that they were all of one make. Whether this was by accident or design was not made known. Chairman Freeman called upon several present to discuss the statements of the speaker, but instead of a discussion it was almost unanimous agreement as to past achievements and fixture prospects. The speakers were Messrs. Doane, Hyde, Williams, Hammer and Jones and Dr. Elliott. An audience which caused the occupying of every seat was very enthusiastic. No prominent gas man, however, was in evidence.—'O.'"

APRIL MEETING, NEW ENGLAND SECTION ILLUMINATING ENGINEERING SOCIETY.—The April meeting of the New England Section of the Illuminating Engineering Society was held the evening of last Tuesday in the well set up Assembly Room in the Edison Building, Boylston street, Boston. Here it might be well to note that hereafter the meetings of the New England Section will be held the second Tuesday of each month, and the hour for calling the sessions to order has been set for 7:30 P.M., the change having been made for the convenience of those living out of the city. The attendance was excellent, and the main topic for discussion was how best to arrange for the lighting of a retail shoe shop. An excellent blue print giving all the necessary dimensions and other details had been mailed to every member, wherefore the members had ample time to prepare notes respecting the best solution of the problem. The different lighting interests were asked to submit examples of arc, incandescent and Nernst electric lighting, also through the gas field by means of modern types of mantle illumination. This novel method of bringing out practical plans was markedly successful, which statement will have to suffice for the moment, especially as we hope next week to give the verbatim results of the discussion. In fact we are sure that Chairman Codman and Secretary Ware will not object to the publication of this matter prior to its appearing in the regular way in the "Proceedings" of the Society.

THE GAS ENGINEERING COURSE, SIBLEY COLLEGE.—We are indebted to the courtesy of Prof. Henry H. Morris, for a copy of the circular letter which Sibley College of Mechanical Engineering and the Mechanic Arts, of Cornell University, sends out each year to the Alumni. The phenomenal growth of the University is of course most gratifying to all who have at heart the going success of advanced methods of instruction, and we think it will not be taken amiss if the remark is here ventured that, although Cornell may not have in as great degree age as a factor in its general attractiveness to coming students, as others of its contemporaries, it is certain that its up-to-date standing is not exceeded elsewhere in the States. Certainly our readers will be more interested in Cornell's attitude and practice towards gas engineering students than in its other great scientific educational divisions, accordingly we here reprint from the "Department Notes" the following mention of its good work in the teaching of gas engineering: "In order to meet the constantly increasing demand for training in gas engineering, four courses have been established. First, a course of lectures on the general theory of gas engines; second, a course of lectures on gas engine design; third, a drafting room course in gas engine design; and fourth, a lecture course which treats of the engineering problems involved in the conversion of various solid and liquid fuels into gas fuels, and in the transmission of gas fuels. This course discusses the different gas making processes and gives descriptions and studies of designs of apparatus used. The object of these four courses is to give to the student taking them the fundamental ideas of modern gas engineering. The engine laboratory, which was moved into one of the small buildings in the court, after the building had been rendered fireproof by concrete walls and floor, has proved a very satisfactory addition to the laboratory and will doubtless produce much valuable scientific information. It is now equipped with examples of every important type of gas engine which has been produced since the time of Brayton. A producer gas plant is being installed and will soon be in practical operation. Through the kindness of John Wilkinson, M.E.—Cornell, 1889—Chief Engineer of the Franklin Company, a 4-cylinder Franklin engine has been presented."

CURRENT COMMENT.—

THE Gas Bench Construction Company, of St. Louis, Mo., will erect two benches of vertical 4's in the works of the Columbia (Mo.) Gas Company. The installation will be designed with one producer, so that the 8 retorts, or only 4 retorts may be operated, according to the necessity occasioned by output demands. This piece of construction will no doubt be watched with interest by American gas engineers, who are all closely following the developments in this type of apparatus. The installation will possibly be the largest, when completed, in this country, and the Company may take considerable credit to itself over this "bit of pioneering." The bottom mouthpiece will be opened and closed by patented lever devices, in such manner that the stokers will not at any time be required to go under the benches. Patents on this form of construction have been applied for by the Gas Bench Construction Company.

THIRTY-SEVEN years ago (April 6, 1871) Colonel Frank S. Richardson was elected Treasurer of the North Adams (Mass.) Gas Light Company, and on the day that he was chosen to that office he started out to take meter statements. He does not take them now, as will be understood all the more readily when one is told that the Company's payroll was then $160 a month, whereas now it is not less than $1,000 a week. And through it all he has remained the same quiet, urbane, alert gentleman, loved by his intimates, admired by his co-workers and respected by his employees.

MR. EDWARD RICH SPAULDING, son of the late Elbridge Gerry Spaulding, whom he succeeded as President of the old Buffalo (N.Y.) Gas Light Company, died at his ranch in Santa Barbara, Cal., the night of the 8th inst. Owing to a pulmonary affection, deceased had lived for the greater part of several years in Santa Barbara, although he always maintained a home in Buffalo. His death was caused by injuries received through the running away of a spirited team which he was driving. Mr. Spaulding was born in Buffalo, November 7th, 1845, and had been prominent in the business affairs (particularly in the banking line) of that city for 30 years or more. He is survived by his widow, two daughters and two sons.

AT a special meeting of the executives of the Louisville (Ky.) Gas Company, held the 30th ult., to consider the death of Mr. George Gaulbert, a member of its Board of Directors, the following resolution was ordered spread on the records of the Company:

"Mr. George Gaulbert, a member of this Board and representing the interest of the city of Louisville in the Company, died on the 26th of March, 1908, and we, his fellow directors, desire to enter upon our records our appreciation of his integrity, wisdom, firmness of conviction and his high conception of duty imposed upon those holding the position of Director in the corporation. It has left its impress for good upon the Company. We shall miss his kindly greeting and his wise and judicious counsel. We record with sorrow his death and the loss this Company has sustained in it. To his family and friends we extend our earnest and heartfelt sympathy."

MR. C. H. WILLIAMS has resigned the position of Manager to the La Crosse (Wis.) Gas and Electric Light Company. His successor is Mr. P. M. Gelatt, who was nominally Assistant Manager to the Company.

[Official Report.—As Furnished by the Secretary.—Continued from Page 626.]

THIRTY-EIGHTH ANNUAL MEETING, NEW ENGLAND ASSOCIATION OF GAS ENGINEERS.

Held in Young's Hotel, Boston, Mass., Feb. 19 and 20, 1908.

First Day—Afternoon Session.

Discussion on Tar—Continued.

The President—These facts offered by Mr. Barnes are all very interesting. Would any member wish to ask Mr. Barnes anything further? If so, an opportunity is now given.

Mr. Egner—I am sorry I was not here to listen to Mr. Miller's paper, but I was so impressed by a wrinkle of how to dispose of coal tar that I hope you will pardon me for telling you. Many of you may not have heard it; it was entirely new to me. An old gas man of some 30 years standing told me that at a works that he owned he could not sell his tar, and this is how he disposed of it. He put the tar in a large iron kettle and set fire to it on top, then stirred the burning tar a certain time until the light oils had been burned off. Then he put the fire out by putting a cover over the kettle, and the remaining tar and pitch would then be stored anywhere anytime. He had no sale for the tar, but he got a good price for the pitch. The only thing about it he did not like was the immense amount of smoke that it made. I suggested to him an arrangement by which he might utilize the smoke, which was really lampblack, and lampblack has a good fixed price per pound. The thing is simple, there is no patent, and anyone can do or try it. I know it has been done by Mr. Sylvester Watts, of Columbia, Mo., one of the original founders of the former Western Gas Association.

The President—Thank you, Mr. Egner. Has any other gentleman any contribution to make or any question to ask?

The Secretary—I would ask Mr. Barnes if I am correct in recollecting he said he found in his experiments it did not seem to make very much difference whether they put on the top dressing of stone while the tar was hot, or at an interval, I think, of over night.

Mr. Barnes—No difference at all. The penetration was about the same. It required a little more crushed stone to absorb the tar; therefore the penetration in the old road could not have been the same; but it appeared the same from working it.

The Secretary—Does it follow from that that one application could be made to do the business, instead of two, as the specifications say?

Mr. Barnes—I have only used one application in all my work.

The President—Is there any other question to be propounded? I am sorry to close this discussion, but hearing no question we will proceed to the reading of the next:

> "What has experience to date shown to be the comparative merits of inclines, machine operated, double-ended and vertical retort systems?"

That is a very large question, gentlemen. We have Mr. Egner with us, and we would like very much to hear him upon that question.

Mr. Egner—Like Captain McKay, I was glad to get copies of the questions to be asked and papers to be read, and I prepared a short statement yesterday on that subject on my way here, and I will read it to you. This question may be answered briefly and yet comprehensively by enumerating the merits of the vertical retort system. Upon unexceptionable authority certain merits are inherent to the vertical retort system, with which the others named cannot be compared at all, because they are without them. By employing the vertical retort system in the manufacture of coal gas, there will be: First, *no naphthaline*. And you know what that means, not only at the works, but in street mains, services, meters and house connections. This one merit alone would entitle the system to favor, or at least serious consideration. Second, no pitch in the hydraulic, and no stopped ascension pipes in the retort house. These two merits are unattainable with either horizontal or inclined retorts. But there are others, and while these are comparable with other systems, they are just as unattainable by any of them. While the inclined retort system was a long step in advance, and for which reason those engineers who have erected installations of inclines have no cause to reproach themselves not to have waited, like many others may have, for further developments, the vertical retort system presents such notable advantages or merits that to neglect them appears to me to be now inexcusable on part of gas engineers. Although I cannot add much from personal experience, and am unable to contribute entirely original information on this most important subject, I have followed up the progress of this great improvement with interest from the beginning. As evidence of my early interest in the subject of vertical retorts, I beg leave to state that, in the spring of 1887, I designed, erected and operated a small plant with retorts of that description. The plant to which I refer was operated very successfully for some months. It was used to carbonize animal bones and produced bone-black, tar, ammonia in abundance, and gas, which was used to light the factory and in heating the 2 benches of 7 vertical retorts composing it, along with condenser, standard washer-scrubber, tar separator, exhauster and sulphate plant. You see it was a very complete little works, but was destroyed by fire of incendiary origin and never rebuilt. It was my intention last summer to go abroad and visit some of the many works where the vertical retort system has been adopted; and while said system has only been before the public about 3 years, there are now 19 or 20 gas works, with altogether nearly 1,400 vertical retorts in operation, which alone speaks volumes in favor of the system. By reason, however, of the ter-Centennial Exposition at Norfolk last year, I put off my trip, which was to be made in company with a veteran in the gas business, who in consequence went without me, and with the result that, shortly after his return, he decided to erect 2 benches of 4's, on the vertical system of retorts, at a gas works of which he was the principal proprietor; and I may say that the contracts for the work have been let. In designing and erecting a coal gas works for the city of Fredericksburg, Va., 3 years ago, I chose the inclined retort system. The verticals had not yet been tried out as they now are, and I did not feel at liberty to experiment with other people's money as I did with my own in 1887, as I have mentioned. But in building the retort house, which contains only 2 benches of 4 inclined retorts each—you see, a very small works, but quite successful and satisfactory to its owners, for whom it had displaced an older works with horizontal retorts—I left room for another bench; and this, to be one of vertical retorts, if I shall then, when greater producing capacity is needed, have anything to say about it. And now let us return to the "comparative merits" of the different systems. I have mentioned two of the merits, but as the older systems could not even be in the same class with the verticals, these were put down by themselves, though not to be overlooked or forgotten. I shall leave that with you. The following information has been abstracted by me from a most excellent paper by Mr. Ernest Körting, whom I had the honor to meet at Vienna, Austria, 11 years ago, but who is now the General Managing Director or Engineer for the "Imperial Continental Gas Association," of London, England, at their works at and near Berlin, Germany. From Mr. Körting's figures I gather that he was using the same kind of coal in horizontal, hydraulic, stoking machine operated, inclined and vertical retorts, and this on a large scale. The different systems were being and are now operated in the same section of the country, under equally skillful management and by thoroughly experienced workmen; hence these figures are significant. The coal carbonized appears to have yielded the same quantity of gas in hand stoked or inclined retorts, while the machine operated and the vertical retorts produced more per ton than the other systems, but an equal quantity as compared with each other, viz., the machine operated and vertical retort systems. Similar coal produced at Dessau, the home of that particular system of vertical retorts, 11,292 cubic feet of 18.36-candle and 631 B.T.U. gas. Mr. Körting's figures are as follows: Gas per ton of coal, 11,300 cubic feet. This coal, producing 70 per cent. by weight of coke in every case, with the vertical retorts yielded 112 pounds more and better coke than with the horizontal or inclined retorts. In other words, where the total production of coke per ton was 1,568 pounds, there would be only 33.6 pounds of breeze from the coke made in the vertical retorts, while the others ran up to 145.6 pounds in the same quantity of coal carbonized. The coal used in the vertical retorts produced 112 pounds of thin, brownish tar, evidently of better quality than the 100.8 pounds of black, pitchy tar per ton of coal, obtained from like coal, only coked in vertical or inclined retorts. The yield of ammonia from coal distilled in vertical retorts was 33.27 per cent. greater than in the other systems; or, where the vertical retorts produced 7.054 pounds of ammonia, the horizontals and inclines gave but 5.291 pounds, or about 21.22 gallons of 5° Twaddel liquor for the horizontal retorts. The fuel required to heat the benches was the same for horizontal and vertical retorts. The inclines required a little less. The actual quantity used was 20 per cent. of the coke made, or 313.6 pounds per ton of coal carbonized. This was found to be in about the following proportions:

For machine stoked retorts (horizontals).... = 3
For inclines..... = 2
For vertical retorts..... = 1

These figures include the retort house foremen, stokers, clinkerers, scurfers, engine drivers, machine men and boiler firemen. As to retort house labor alone, Mr. Körting thought that a make of 2,825,000 cubic feet in 24 hours, with only 4 men all told, was within the bounds of or reach of possibility. The actual cost of construction was found to be 12 per cent. less for the vertical system over the inclines, and about 20 per cent. less than for horizontal, machine-operated retorts, including machinery. The actual cost for repairs for horizontals (which have been as were the inclines in operation for years) was per unit proportionately 38.1; for the inclines it was, per unit, 26.3; and for verticals (estimated) per unit, 14. Another "merit" of the vertical retort system over all the others as found to be, is that the production of bisulphide has been reduced over 50 per cent., which certainly means a whole lot, especially to people who can get gas coal of good quality, but with the sole drawback that the sulphur contained is excessive. Now for the "reason why" coal carbonized in vertical retorts should yield so much better results. This has been pointed out by several able engineers, and must be self-evident to every thinking man, after once having attention drawn to it. It is because in all horizontal and inclined retorts the gas produced must come into contact with the large superheated space above the coal or coke in the retort, which in turn causes the production of pitchy tar, naphthaline, cracking up of illuminants and the other evils, without any compensating good. A great deal of this was pointed out by a German by-product coke oven engineer, in an address delivered to the German Association of Gas Engineers some years ago. This German Engineer's name was, I believe, Herr Hilgenstock. I am sorry I do not remember his full name and address. But this gentleman pointed out by analogy what took place during carbonization in coke ovens, where the layers of coal were often 6 feet or more in depth. Here it was seen there was no need of providing an outlet of gas in a vertical retort anywhere but at the top. That, as the coking process proceeded, from the coal nearest the retort walls, inwardly, the gas made a way for itself through the center of the mass, and as it thus never came in contact with the superheated walls of the retort, the result was precisely as has now been so well demonstrated, and of which facts I have tried in my feeble way to make you acquainted.

The President—That is all very interesting, and we are certainly obliged to the grand old man of our industry, or the grand young man of our industry——

Mr. Egner—Thank you.

The President (continuing)—for what he has had to say. Mr. Africa has contemplated, and in fact has made up his mind, that he would go into the vertical line of carbonization, and we would like to hear from him.

The Vice-President—Mr. President, we contemplated vertical retorts, not only contemplated them but have 2 benches of 9's about completed. We started last fall and the brickwork will be done in about a week or 10 days. Of course we have not fired them up and cannot tell you anything about the results.

The President—Thank you, Mr. Africa. Mr. Kennedy, can we hear from you? You are recently from across the water. Did you run across any verticals while over there?

Mr. Kennedy—I have not seen them and know nothing about their details.

The President—Has any member any further facts on this very interesting and weighty topic? If so, we shall be glad to have him give us the benefit and advantage of his knowledge. I hate to call on Captain McKay, but he is so well posted that he will forgive me if I do call on him.

Captain McKay—Mr. President, I was very favorably impressed with the German verticals and also with the English verticals. There is an essential difference between these processes, one being the charging of relatively a large quantity of coal at periodic intervals, while in the English system it is the almost continuous charging of small quantities and the continuous withdrawal of the coke. Through the journals you have practically almost all the information that I have, barring what I had from the works themselves. Mr. Egner referred to Hilgenstock. I think I ran across his works, or some of his ovens, in Westphalia, where I saw a great many coke ovens, of many different detail designs. From what Mr. Egner says, however, I imagine the important deduction seems that the gas coming from a coke oven passes up the central channel afforded by the coal which is either not at all carbonized or only partly carbonized, and that thereby the gas and tar are not broken down, and the sulphur is not given out of the gas and carried forward. You see I am getting back to this question of sulphur. This works I spoke of, where we had tons of sulphur a day, is using coal in ovens which are 18 inches wide, 33 feet long and 6 feet high. We sometimes have 1,650 grains of sulphur per 100 cubic feet of gas. I cannot quite square that with the deduction as presented by Mr. Egner.

The President—I think that is a leading question, Mr. Egner. Have you anything to say to the young man?

Mr. Egner—Well, I would say that the friend to whom I referred as having gone over there, and with whom I intended to go with a view of seeing the installations, is the one who gave me this wrinkle about coal tar which I mentioned a little while ago. He is Mr. Sylvester Watts, of Columbia, Mo.; or rather he lives in St. Louis. He visited and saw the "Woodall-Duckham," the "Settle-Padfield" and other systems in England, and the "Bueb" system at Dessau and in Berlin. The statements I made here were based on information obtained on the spot. This matter of a smaller amount of sulphur is only of comparatively recent discovery. The inventor did not know at first what to attribute it to, but he kept watching and experimenting and finally he came, not to the conclusion, but to the proof of the pudding, that that was the fact. Of course, in the coke ovens Captain McKay speaks of, the layers are only 5 feet or so high, while these retorts are nearly 15 feet high, and the gas goes off at the very top, whereas in the coke ovens it still has some hot walls to pass. That may account for the difference, if any; but that the results stated here are facts I believe may be taken from the authorities I quoted.

The President—Thank you, Mr. Egner. Is Mr. Miller still with us? Can you help Captain McKay out of that difficulty he sees?

Mr. Miller - I unfortunately had to leave the room and I just came in as Captain McKay mentioned the 1,650 grains of H_2S. That is an enormous amount.

Captain McKay—That is the bait I have been trying to catch you with.

Mr. Miller—I would like to ask the Captain if he does not get some bisulphide of carbon in this gas. When the H_2S runs so high I have noticed very often that bisulphide of carbon is present.

Captain McKay—Yes, we have no trouble in getting the bisulphide of carbon, but we have an awful lot in getting rid of it.

Mr. Miller—So you do get bisulphide of carbon?

Captain McKay—Yes. We have sometimes 45 to 48 grains of bisulphide. Will Mr. Miller, before he sits down, kindly tell us how to get rid of it?

Mr. Miller—The only way I know is with lime, which is very expensive. I experienced the same thing in a plant with which I was connected out in Kansas some years ago. There the coal contained as high as 16 per cent. sulphur. It was necessary to hand pick it, and the sulphur came out in lumps. But despite all precautions, bisulphide appeared in the gas, which was purified with lime in addition to oxide. Possibly Captain McKay has invented some new method.

The President—Well, Captain, I am afraid that you will get very little good out of Nazareth. It is a case of working out your own salvation. I think the next President ought to get you to contribute a paper on how you found it, how you felt when you found it, and how you got rid of it. That would make a very interesting paper, because I know before another year you will have settled all those things to your satisfaction. Is there any other remark on the verticals?

Captain McKay—Before that question of verticals is entirely dismissed, it may be well to call attention particularly to the sulphate yield. If there is this protection afforded, as described by Mr. Egner, and it seems reasonable to suppose that the low temperature does protect the gaseous product, that would help to explain why there is this large yield of sulphate. That is one reason why this vertical system is of particular interest to us gas men, No market is more attractive to us than the sulphate market, and if we can increase the yield of sulphate, as appears now to have been done, by 40 to 50 per cent. above what we now get, certainly that is a matter that should engage our very serious examination.

Mr. Egner—I would like to say a few words more in the line of what Captain McKay said. The figures given in the remarks I made a few minutes ago are the lowest figures. Fifty to 55 per cent. increase in ammonia is freely claimed as being obtained, whereas I quoted the low average of only 33.27 per cent. The reason this is possible, as well as the reason of the smaller sulphur production, is exactly as Captain Kay stated and explained. One more thing I had nearly forgotten. Two kinds of vertical retorts are now being used. Some are about 15 feet long, and some are nearly 4 feet longer. It has been found that the shorter retorts give the all-round best results.

That might be well to put down, for it has been tried out, that the retorts which are a meter shorter seem to give better results than the very long ones.

The President—We are blessed by having Mr. Carpenter here. Of course we all want to see him since he has been elected to the greater office, but still we want to hear what he has to say on this question of verticals. We shall be very glad to hear from him.

Mr. Carpenter—Mr. President, I am not prepared to discuss this question of verticals. I am sorry, I wish I could.

The President—We don't want you to discuss it, but you possibly observed in England some of those verticals in use. Anything you can say.

Mr. Carpenter—I have not been in Europe since the verticals became popular.

The President—Well, we are sorry; but we will hope in time to hear something good from Mr. Carpenter on verticals. Is there any other gentleman who has anything to say before this question is finally disposed of?

Col. A. P. Browne—Mr. President, is this paper to be printed?

The President—It will appear, I suppose, in the records of the American Gas Light Journal and the "Progressive Age." The Secretary has a question he would like to introduce.

The Secretary—

> "What methods do gas companies pursue to protect their mains from excavations made by others that are likely to disturb the gas main unless such excavations are properly filled?"

The President—Gentlemen, there is a broad subject. Mr. Gould, I think, possibly would be the best man to open up this fountain of knowledge and drench Mr. Gifford with it. Mr. Gould.

Mr. Gould—The safest way is to take out the mains and put them back after the excavation is filled. That is what we do on all the subway work. We remove our mains and put in temporary pipes, and after the streets are back-filled with a reasonable degree of solidity relay the mains. On the ordinary sewer excavations we are up against this trouble all the time. I presume we spend $20,000 a year removing mains on account of sewer excavations and putting them back, using temporary pipes occasionally or bracing them up. Unfortunately in Boston a separate system of sewers invariably takes the gas company's side of the street for the surface drains. Originally the sewers were in the center of the street, with the water pipe on one side and the gas pipe on the other. Now the sewer department when building sewers for surface drainage prefers to disturb the gas pipe rather than the water pipe owned by the city. We receive no compensation for it, but employ several inspectors to look out for our interests and finally relay the pipes. I don't know any royal way of protecting them, except to spend money and relay them.

Mr. White—I would like to ask if it is customary for the companies to put on an inspector and follow up the work of other companies in this regard, and see that no damage is done.

The President—How do you find it in Boston, Mr. Gould?

Mr. Gould—We employ two inspectors right here in the city proper on general work, and employ from two to four on subway work. Then we also support two or three inspectors appointed by the city and placed on our pay roll. These inspectors are employed on an 8-hour basis, and if we claim the privilege of working 9 hours we have the privilege of paying some of them for that extra hour, although they may not appear on the work till some indefinite time. The sewer inspectors always insist on getting 9 hours pay, because we start work at 7 and the city starts work at 8, regardless of the time they arrive on the job.

The President—Does that answer your question, or would you like to have other cities report? Mr. Barnum, how is it in Worcester?

Mr. Barnum—They have put in a seperate system of sewerage. They have taken the side and location of the gas pipe, and the only way is to take out the pipe and put in a temporary one, and when they get through put the pipe back on a good foundation. Regarding inspectors, the burden of watching other peoples' work is not on the gas company. If they disturb the pipe and you don't know anything about it, and there is an accident, and you can prove that they have caused the break, it is up to them to pay the damages.

The Secretary—I would like to ask Mr. Barnum if he can recover of them? The burden may be on them, but can he recover?

Mr. Barnum—No; but he cannot recover from you.

The Secretary—How about the public, that recover from you on the result of the accident?

Mr. Barnum—They cannot recover.

The Secretary—I hope the Worcester law will come to Boston, then.

The President—Mr. Nute, didn't you have a little trouble or experience on that line in Fall River, or has that matter ever been settled?

Mr. Nute—No, it has not been settled. Ours was not the sort of case Mr. Barnum refers to. It was not a case where the pipe had been undermined.

The President—Then I was in error. Well, gentlemen, you have suffered so much from close air to-day that I think possibly it would be wise to adjourn this meeting till to-morrow at 10 o'clock A.M. sharp.

Second Day—Morning Session.

The President—The first business of the morning will be a

Report from the Nominating Committee.

Mr. W. A. Learned—I beg leave to present the following Report of your Nominating Committee, who recommend for office bearers the following gentlemen:

For President—W. G. Africa.
For Vice-Presidents—William H. Snow and Benjamin J. Allen.
For Secretary and Treasurer—N. W. Gifford.
For Directors—Thomas H. Hintze, D. D. Barnum, C. A. Learned, J. A. Coffin and H. K. Morrison.

The President—Gentlemen, you have heard the report.

Mr. Addicks—Mr. President, I move that the report of the committee be accepted and that the Secretary be instructed to cast one ballot for the officers as recommended by the committee.

Election of Officers.

The report of the committee was accepted, and the unanimous vote of the Association was cast for the gentlemen nominated.

The President—Gentlemen, it gives me a great deal of pleasure to inform you that you are elected. As usual, we would like to hear from our newly elected President. Gentlemen, I present President Africa.

Some Responses.

Mr. Africa—Gentlemen, I wish to thank you for electing me to the highest position in your Association. I feel it is indeed quite a privilege and honor to be President of this, the oldest and best Association in America. Gentlemen, I thank you. [Applause.]

The President—If Vice-President Snow would like to say a word we would be glad to hear from him.

Mr. Snow—Gentlemen, I can only express my appreciation and thanks for the honor that has been done me in naming me for this position. [Applause.]

Routine Business.

Mr. Addicks—Mr. President, yesterday, I regret to say, I was tardy, and I understand that the resignation of Mr. Malcolm S. Greenough was presented. I don't think it was thoroughly understood. I know a great many others did not realize that fact. I want to move, sir, that the acceptance of Mr. Malcolm Greenough's resignation be reconsidered by the Association, that the resignation be laid upon the table, and that the Secretary be requested to ask Mr. Greenough to withdraw his resignation from active membership. Mr. Greenough's name has been associated with this Association from the foundation. His name will be found in the corner stone of this, the oldest Association and the mother of all the Gas Associations, and I think it is most fitting that that action be taken. I trust that somebody will second the motion.

Mr. Africa—Mr. President, I am very glad to second that motion.

The President—Gentlemen, you have all heard the motion of Mr. Addicks, which has been duly seconded. I think it commends itself to us all. [Adopted.] Mr. Secretary, you will see that Mr. Greenough is requested to acquiesce in the resolution. The President then called upon Mr. W. H. Gardiner, of New York, to submit the

Report of the Committee on Uniform Accounting and Depreciation.

[For the text of the Report see Journal, *ante*, page 444.]

Discussion.

The President—Gentlemen, you have heard the report of your Committee on Uniform Accounting. What is your pleasure?

Mr. Africa—Mr. President, I move that the report of the Committee be accepted, and that they be continued for a year, as suggested.

Mr. Addicks—I would like to second that motion and, if I may, add to it that they be asked to co-operate with the Committee of the American Gas Institute. I think it is very fitting that some co-operation should extend to that Institute.

The President—Gentlemen, you have heard the motion, which has been made and seconded. [Adopted.] In passing, I would like to say we surely are indebted to this committee, as we are also to Mr. Gardiner. I trust it is apparent to all how much and how valuable is the work he is doing for the Association. It cannot but be highly appreciated, too. We will now listen to the paper by Mr. Charles F. Leonard, of Fall River, Mass., on

A REINFORCED CONCRETE OIL TANK BUILDING: DESIGN, MAINTENANCE AND COST.

[For the text of Mr. Leonard's paper, see JOURNAL, *ante*, p. 576.]

Discussion.

The President—We have listened to a very excellent paper, and would like to hear from Captain McKay on what has been submitted.

Captain McKay—The Secretary kindly sent me Mr. Leonard's paper and asked me in relation to a similar construction of our own. The use of the concrete reinforced, as Mr. Leonard has described it, was very much the same in the tank pits that we have constructed. The purpose of these tank pits was to receive a steel tank in the same way as Fall River designed, but we have no roof over them. The steel tanks themselves rise above the level of the concrete pits, and the only purpose of the pit is to contain the contents of the steel tank in case of rupture or accident. During the summer of 1907 we built at our Everett station two reinforced concrete tanks or tank pits, each of which was designed to contain a steel oil tank of 500,000 gallons capacity. These tank pits are 77 feet, center to center, each pit is 71 feet in diameter, 18 feet deep, and, with its contained oil tank, is carried by 493 piles spaced 3 feet centers. The ground was very soft, the upper 10 feet being discarded lime beneath which was soft marsh mud for a variable depth. The piles were cut off at grade 7; permanent water level is about grade 8; mean low water is nearly at grade zero; highest high tide is about grade 10. The foundations of the two tanks are entirely independent of each other. The concrete bottom is made 18 inches thick for an annular ring 14 feet wide, 12 inches on top of the piles and 6 inches around them; the rest of the bottom is 15 inches thick, 12 inches on top of the piles and 3 inches around them. The bottom concrete is reinforced with expanded metal, 3 inches, No. 10, double-strand, laid close to the top of the piles. The tank bottom is required to withstand outside upward pressure of water standing to grade 10. The bottom was grooved at the outer edge, 6 inches wide by 2.5 inches deep, for bonding with the side walls; additional bond was given by ½-inch steel rods bent through 90°, placed 2 feet on centers, with one leg vertical, and about 1.5 inches from the outer face of tank wall. The concrete used throughout the work was a 1:2:5 mixture, with 5 per cent. hydrated lime; the top inch of the bottom concrete was mixed with 2 per cent. Medusa compound. The lime and the compound were to help the tightness of the concrete; the lime is also good for concrete that is a little fresh. When this construction was under way the demand for cement was such that it was difficult to get shipments in time, and we frequently received it too fresh from the manufacturer. This use of lime corrected that defect. The bottom has a slope of 5 inches to 6 inches in the total diameter. The central portion of the bottom is horizontal and stands at a slight elevation; on this is placed the steel tank, 54 feet in diameter by 32 feet in height. The slope of the annular ring accommodates drainage of rain or other liquids to one point for convenient pumping. The wall of the tank pit is 12 inches thick and 18 feet high, with a coping 14 inches wide and 6 inches deep. The specification required that the tank wall be reinforced with 25 rings of 1-inch round steel, 9 rings of ¾-inch and 2 rings of ⅝-inch, and that a ring of ⅝-inch steel be built into inner face of wall near the upper edge; this last is to protect the wall from injury during the construction of the steel tank. The 1 inch reinforcing rods are in the first 10 feet of the wall, the ¾-inch rods are in the next 6 feet, and the ⅝-inch rods are in the top 2 feet. These rods are bent to a radius 2 inches less than the outside radius of the wall; the ends of each section of rod are bent through 90° for a length of 4 inches in order to effect bonding of parts of a ring, and entirely to prevent slipping at the joints or laps; in a part of the wall work the steel rods are lapped 60 diameters and wired together, in lieu of the 4-inch bent ends. Vertically, the reinforcing rings were held in position by two ¾-inch channels placed back-to-back; the reinforcing rings were carried by ½-inch bolts that were passed through the small channels and clinched on each end, thus holding the channels close together and giving good support to the steel rings. These channels were about 8 feet apart. The forms were made of ¾-inch matched spruce boards, 6 feet 6 inches long, dressed on one side and nailed to 4 stringers of 2-inch by 10-inch spruce, cut to the proper radius. The forms were in sections about 14 feet long; they were oiled with "petrolatum," a distillate of petroleum. The forms were spaced with wooden spreaders and were held together with rods ¾ inch diameter, spaced 3 feet 6 inches centers, threaded both ends and drawn up with hand nuts. After placing the first ring of the wall concrete, the forms were lapped 6 inches on the finished wall, and the ½-inch bolts passed through just above the concrete, drawing the forms tight against the wall to insure a good joint. On removing the forms the holes left by the ½-inch bolts were carefully filled with cement mortar; the ½-inch rods were oiled to permit their easy removal from the concrete. The forms were not braced to the bank or staging except when it was necessary to force them in or out to bring them to the correct radius. The concrete was mixed in a ¾ cubic yard cube mixer; a derrick was used for swinging the skips of concrete on to the platforms, convenient for shoveling the concrete into the forms. The concrete was quite wet; it was tamped with 1½-inch by 6-inch wooden tampers and it was spaded from the forms. Before depositing new concrete on concrete that had set, the surface of the old concrete was thoroughly washed and then covered with a layer of neat cement, or with a rich mixture of cement and sand. When finished the walls were plumb, true to radius and with no disfiguring joints. The inside faces of the walls and of the bottom concrete were painted with thick tar or thin pitch, applied hot, in warm, dry weather. These tanks have not yet been tested by filling with water, because the steel tanks were not completed until cold weather had set in. We are confident that the contractors will be able to fulfill their guarantee as to tightness, as we have built 3 concrete holder tanks into which no water has been added since they were placed in commission, all proving perfectly tight; we have just completed filling with water a fourth concrete holder tank, with no sign of present loss of water. We have also in use a concrete tank for ammonia liquor that has proved entirely tight, and a concrete tank for water storage. All these tanks are of concrete reinforced with steel, the thicker walls with steel in two vertical planes. In each oil tank pit there are 400 cubic yards of concrete, about 24,000 pounds of steel rods, and, allowing for laps, about 4,800 square feet of expanded metal. When the steel tank is filled with water the maximum load per pile below the concrete is 6 tons. Excavation was begun May 14, 1907, piles had been driven and work begun on the concrete tanks June 11, 1907; the first tank pit was finished July 22, the second was finished August 23, 1907. No pumping was necessary, because all water from the adjacent territory was drained into the deeper excavation then underway for a holder tank, and the contractor for this work pumped for his own necessities and the benefit of other contractors. Without dividing the costs between excavating, backfilling, concreting, reinforcement, etc,, but measuring the total cost of the work against the total concrete placed, this figures, exclusive of the pile driving, $15 per cubic yard. There is no record here of the expense for engineering, drafting and inspection, which would amount to quite an item.

The President—A very interesting addition to the good paper we got from Mr. Leonard. Would anyone present like to make remarks on or discuss the matter? We shall be very glad to hear from anyone.

Mr. Wyant—Did Mr. Leonard find the tank constructed as he has described it perfectly tight when filled with water?

Mr. Leonard—We have not yet filled it with water.

Mr. Wyant—My reason for asking is we have several concrete tanks, and before building the last I tried for a long time to find some way of making the placing of the concrete a continuous operation, but finally had to give it up. The only trouble we have found in these structures is a weakness at the joints where the different layers of concrete are put on, and that difficulty is increased if the tank is out in the open, where the sun can strike it from all sides, because there apparently contraction and expansion are going on all day as the sun follows around the structure. We have had more or less tronble at these joints from a small amount of seepage. It is not, to be sure, very much; nevertheless it is enough to produce a streak of moisture on every section. So that in building the various structures since the first one we have taken special pains in that particular, and the last tank I think is somewhat better than the first. It seems there is a great advantage in building these tanks in putting the reinforcing material as near the outside surface as possible. In the initial set of the concrete, I have been absolutely unable to avoid some settling, although I kept the concrete thoroughly soaked in order to prevent that settling. I have not found a section which upon setting hard did not show distinctly a line of cleavage over the reinforcing rods at the top of the section. This, of course, produces a porous place in

the concrete on the line of the reinforcement, and the farther away we get that condition from the inside the tighter the tank.

The President—There is an opportunity for any additional questions. Mr. Humphreys?

Mr. J. J. Humphreys—I would ask Mr. Leonard whether he considers the proposition of using a double-walled steel tank instead of his concrete mould? The cost would be possibly a little less than the concrete.

The President—Possibly it will be advantageous to have recorded all the questions that are to be asked of Mr. Leonard, so that he can answer them at one time when he is on his feet. Are there any other questions that members would like to ask Mr. Leonard?

Mr. Gardiner—I have not a question, but in connection with the possible joint and leakage at different layers when concreting has been suspended for a period, say over night, I quite a number of years ago put in a great deal of concrete, and in laying the layers I got a great deal better joints where I had to stop operations for a few hours by sweeping the surface as rough as possible, and leaving it rough. Instead of allowing the accumulation of sand and cement and water which usually comes to the surface of a tamped layer to remain there and harden, I had that all swept off and discarded, so as to leave as rough a surface as possible. Then that hardened into a rough surface, and the next layer was started on a rough surface instead of being started on a smooth surface. That helped the tightness and also helped the strength. It formed a bond. A greater area was exposed.

Captain McKay—What was the character of the soil where this construction was made at Fall River?

The President—Well, Mr. Leonard, if there are no more questions forthcoming possibly it is time for you to answer those on hand.

Mr. C. F. Leonard—Regarding seepage of a concrete tank, I think it has been thoroughly demonstrated that it is possible to erect a concrete water tower, for instance, and have none. There are some in New England. I know of one, 100 feet high and approximately 50 feet in diameter. The claim is made it shows no signs of seepage or leakage of any character whatever. And there have been any number of smaller ones. As to a double-walled, steel tank instead of a concrete one, that point was not considered by us. I am inclined to think, however, that a steel tank would cost a little more. Captain McKay notes the cost of $15 per cubic yard. I presume that was the cost of the whole thing, including foundations. I have not given any cost regarding our foundations. The cost of the side walls was primarily compared with brick building. The foundation of the tank I think cost something like $5 a cubic yard. That would bring the cost of the side walls of the concrete structure, for the whole, down per cubic yard. The bottom was a blue clay. Regarding seepage at the layers, we put in grooves, pine sticks, so as to leave a groove and to have them bond. It is distinctly advisable to make a structure of that kind monolithic, that is to say, have no vertical joints in it at all; but that increases the cost, on a small job like this one was, of the carpenters' labor, very much. We should have had to lay them off intermittently. We depended on the thickness of the concrete and also taking particular pains to brace the ends where we stopped, so that we could get a thorough bond against the vertical joint to do away with any possible seepage in that direction. That brings up the question of labor. When you go from brick to concrete, in a building requiring forms, you get from the masons into the hands of the carpenters, and when you pay them $3.50 and $4 a day it is desirable, if possible, to so adjust the number of laborers to the number of carpenters that the bulk of the work is done by the former. That was my thought in bringing that feature out to anybody in considering a concrete tank.

Mr. E. C. White—There has been a great deal written and said about steel oil tanks. I would like to ask if anyone here has built a concrete tank in the ground for storing gas oil. In San Antonio, Tex., the Company built a 200,000 gallon concrete oil tank about 3 years ago for storing heavy Texas oils. Before building the tank we realized that it was sort of an experiment as to whether or not it would remain tight, and wrote to chemists to ask their opinion as to whether or not the tank would remain tight and not allow the oil to seep through. The chemists wrote back that it was their opinion the tank would only last a short time and then leak. I would say that, up to this time, it has shown no evidence of leaking. I do not remember the dimensions, but the concrete wall, as I remember, is about 3 feet thick at the bottom and tapers to the top, where it is about 1 foot wide. The bottom of the tank is oval-shaped. I made several tests for leaks by digging down on the outside of the tank; but so far, as stated above, it is absolutely tight. This is why I ask if there are other companies who have ventured to go so far with concrete oil tanks. The top of the tank is of wood and is thickly covered with small pebbles. The tank is airtight as far as possible. Of course it was not essential to have it absolutely airtight. As a precaution against fire we ran a 2-inch steam pipe around the inside of tank near the top with 3 full 2-inch openings and a 3-inch line was run from the boiler direct to connect with the 2-inch line. Only one valve was in line and located in engine room. Case of fire we would throw the valve open and smother the flames. Also had a 2-inch fire hose in the works for fire purposes.

The President—That is a very valuable addition to what has already been said.

Mr. Nute—One little point I think Mr. Leonard did not mention is that the contractor's figures for the tank building were all on a very much poorer quality of concrete than was adopted, so that the difference between the actual cost and the bids was considerably in excess of what the figures show.

The President—We can hardly let Mr. Addicks go back to New York without being touched once in a while for information.

Mr. Addicks—I cannot add anything to the paper on concrete; but I am very glad to take the opportunity to express my pleasure at listening to this very thorough paper, particularly so as my official relations with the writer were quite intimate at one time. I am sure that a paper of this kind is most useful to an Association. The detail is particularly valuable to men who have not at hand the source of information, and I am sure they will be grateful to Captain McKay for the additional information furnished.

Mr. C. F. Leonard—Just one more item in regard to using a concrete tank for oil. There is no reason why it cannot be done, except the possibility of the oil attacking the concrete; that is to say, if a concrete tank will hold water there is no reason why it should not hold oil. Personally, however, I should prefer steel for the primary tank.

The President—You made that neat little speech practically in the form of a motion, did you not, Mr. Addicks?

Mr. Addicks—I am very glad indeed to make that as a motion.

The President—The motion has been seconded. All in favor of the thanks of the Association being tendered to Mr. Leonard, of Fall River, and to Captain McKay, of Boston, will say "aye." [Adopted.] It gives me great pleasure, Gentlemen, to assure you both of our great appreciation of and thanks for the papers submitted. We will now have the pleasure of hearing a paper read by our Secretary on

MAINTAINING MANTLE LAMPS.

In October, 1906, an opportunity to light a drygoods store was offered, provided the Gas Company would furnish the installation. There seemed to be no other way to secure this business, so 15 arcs and 20 single, upright, mantle burners were placed, at a cost of $101. These lamps were to be kept in repair for $90 per year, payable monthly. They were lighted November 1, 1906, and, up to January 1, 1908, had cost for material and labor, $48, and had burned 383.6 thousand feet of gas. At the start it was estimated that 25 cents per month per arc for care, and 10 cents for rental, would keep them in condition, and allow 20 per cent. for depreciation, with a possibility of some deficiency to be charged against new business. At the end of 12 months the excess of income over expense had been 48 per cent. of the installation cost. This looked like good business, but on January 8 the store was gutted by fire. The remains of 14 arc lamps were recovered from the ruins; most of these can be repaired, but at what cost is not yet determined.

In addition to this installation, the maintaining of other mantle burners has been undertaken. On January 1, 159 arcs, 112 single upright and 32 inverted burners were being cared for. The burners in all cases, except the case first mentioned, are owned by the users, and unless some satisfactory insurance arrangements can be had, it seems to the writer much the better way. There may be some other reasons than fire risk occur to you for this conclusion. The following will give some idea of the cost of this work:

Thirty-eight installations of 118 arcs, ranging from 1 to 12 lamps per location, and in time from 1 to 13 months, required 420 hours' labor, 518 mantles, 11 globes, and sundries sufficient to make the total cost $134.25, an average cost per month of 20.91 cents. The highest was 41.50 for any place, and the lowest 10.66 cents.

The average number of lamps per place was 3.1. There are several variable factors in the problem. Where only one lamp is cared for the labor cost is naturally greater, also where the distance between

jobs is great. Fortunately, our work is so located that the caretaker can follow from one job to another without much loss of time. One of the difficult things to contend with is breakage by violence, and not that by actual wear. Of course, we do not assume this, but in many cases it is thrust upon us and we can do nothing but stand it. In case it should become too obvious in any case we should have to stop the game. Though it is only fair to our customers to say that in most cases we have not been much troubled. In the case of single mantles the record is not so complete, as we have only 5 cases where only single upright mantles are being maintained, and these not for long times.

In these 5 we have 38 lights, ranging from 6 to 11 per place and from 1 to 7 months. The average cost for 137 burner months has been 14.8 cents per light. These include a variety of equipment, some plain glass chimneys with reflecting shades, and some with the "Q" globe. The latter seems to be rather better adapted to this sort of work.

Of the inverted type we have no complete instance on maintenance, but the impression gained after caring for them along with others is that it will cost no more than for upright, and probably the breakage of both mantles and glassware will be less. If the consumer would take the proper care of his burners, I should prefer that he do this work himself, and you all know how well he does it; but if he pays some one to come regularly and put his burners into good condition, he is quite likely to see that it is regularly and properly done.

With us the experiment has worked out satisfactorily, for we have lost only 3 customers, and these for reasons entirely foreign to this discussion. In looking for this business we do not trouble a store where the lamps are properly cared for, because we feel sure that the proprietor is satisfied with his service; but where the lamps are not kept up we try to get them.

Our rates are 25 cents per month for 4-mantle arcs, 10 cents for single mantles and 15 cents for inverted, for bi-monthly inspections. When taking on a new job we charge for the material used in the first fitting up, but not for the labor, and begin the regular inspections on the next half month. We find that two visits per month keep the lights in so much better condition than the consumer will himself, that it is very satisfactory, and at the same time admits of the maintenance being a smaller per cent. of the total lighting cost than if more frequent visits were made.

For stores it works out all right, but how to reach the house burner is a question yet unsettled. We advertise that any burner or mantle bought for regular retail price in our office will be installed free of other charge, and that our men will clean and regulate burners, but the general intelligent use of efficient lighting appliances is not yet, but is one of the things to be hoped for.

Since writing this I dropped into the library and saw an installation of 21 inverted burners, that was put in last July. Up to the first of February they had used 15 mantles.

Discussion.

The President—Gentlemen, it is a very valuable asset to any association to have a Secretary who is not satisfied with writing merely the minutes, but who will also write papers for it. He is indeed a very valuable Secretary, an invaluable one in fact. We have Mr. Mason, of the Welsbach Company, with us, and of course it is only proper and becoming that he should speak now. Mr. Mason.

Mr. Mason—I did not expect to be called upon in this matter. I was very much interested in reading and hearing the Secretary's paper. I personally think it is very desirable for the gas companies to take an interest in the service of incandescent lights. The question of costs varies, depending on the labor expense and the character of use, but it seems to me of prime importance that a consumer receive good lighting results. The subject has been carefully taken up in European countries, and there a nominal rate is charged for the service. I think in this country maintenance of arc lamps is very general, but little if anything has been done in a service for private residence lighting. There doubtless is a good deal of difficulty in securing such consumers, but that such a service is desirable I think admits of little or no doubt. Furthermore, it is my opinion that the consumer himself will cheerfully pay a fair, in fact a liberal rate, for a well maintained service. The question of how many inspections are necessary I think depends on the character of the place where the lamps are used. In Philadelphia my Company maintains a great many gas arcs, and in the majority of instances make four inspections a month. We have no difficulty in securing a liberal monthly rate, 60 cents per arc for large installations, and 75 cents for small installations per month. The question of rate in my judgment does not keep people away from using the service. If a man takes the service, and it is a good service, I think he is willing to pay for it. I think the improvement in light and general improvement in appearance are well worth a fair price. Now, in reference to inverted lamps, we have made installations in a number of the United States post offices, where there is a very severe usage, owing to long hours of lighting. I have not the exact maintenance costs, but we charge the government 15 cents per light per month, in some instances 20 cents per lamp per month. We give a regular weekly inspection, and the service is, therefore, very satisfactory; otherwise, I don't think it would be. I think in all installations in factories and shops, and in places where a number of lamps are used, it is highly desirable to furnish a maintenance service, and I think it is proper that a fair rate be charged in order that the service may give the very best possible lighting result.

Mr. Addicks—May I ask Mr. Mason if, with the maintenance of the lamps, he includes the use of lamps?

Mr. Mason—No.

Mr. Addicks—Simply the maintenance of the lamps?

Mr. Mason—Yes.

Mr. Addicks—Owned by the consumer?

Mr. Mason—Owned by the consumer; but in Philadelphia the lamp is put out on an initial payment, varying from $6 to $7.50, which covers the investment cost, and that is then the property of the consumer.

The President—Mr. Burr is here.

Mr. Burr—Our maintenance system in New Haven, as far as arc lamps are concerned, is very similar to that which the Secretary described. As Mr. Mason said, the question of cost is a matter, perhaps, that is determined locally. We have had very good success on the basis of 20 cents per lamp per month, or, if paid in advance, $2 per lamp per year. The Company has not lost any money on that basis, not taking into account the overhead charges. We recently went into the experiment of maintaining the inverted lights. The installation has not been large, and we have only been doing this for the matter of 2 months, so that I think it is a little early to get an accurate idea as to what the results will be later on. In other words, as the number of lamps increases, I expect that we will be able to reduce the cost.

The President—Thank you, Mr. Burr.

Mr. Africa—We have fitted our Post Office with 137 of the reflex lamps, and maintain them at 15 cents each per month, giving two inspections per month. They give very excellent satisfaction.

The President—There must be a great deal of information here.

Mr. Crafts—Mr. President, in Pittsfield we have a somewhat more liberal proposition than either at East Boston or at New Haven. There at the present time we are installing and maintaining arc lights free of charge. I brought with me a summary of the costs of maintenance.

SUMMARY OF MAINTENANCE COSTS—HUMPHREY LIGHTS FOR SIX MONTHS, JULY 1, 1907–DECEMBER 31, 1907.

Lamps maintained owned by consumers	361
" " " " Gas Company	552
Total lamps on maintenance list, January 1, 1908	913
Number separate installations	299
Average number lamps per installation	3.05
" " " maintained 7/1/-12/31/'07	855
Average cost per lamp per month, labor	.06 2/10
" " " " " " material	.07
" " " " " " for maintenance	.13 2/10

Mantles.

Total number used for 6 months	4,020
Average number mantles per lamp for 6 months	4.7
Average number mantles per month	.78

In doing this we make two inspections a month, excepting in some instances where local conditions seem to demand that they be made oftener, in which case we visit the lamps oftener; but at least twice a month we make an inspection of every lamp. The result is, that with free inspection and free maintenance there is not very much trouble in getting in lamps. The suggestion Mr. Gifford made for the maintenance of the single burners personally I think is very important. In the smaller and the medium sized works we see it more than you do in the larger works. We are brought in closer contact with the people, and we realize, I think, that we are somewhat faulty in the service we give them. I believe that thoroughly. We are willing, yes, anxious, all of us, to give the consumers good service, but it is a

fact that, while we take care of any complaint there is, and are very ready to do it, there are a great many lamps that have blackened mantles and dusty chimneys and dust on the gauze, that are not giving good service, that we know nothing about. I spent considerable time on this last fall, and in following up complaints of that kind I was surprised to find how many of them came from that one thing. What the solution is I am sure I don't know. We are trying two or three experiments now in getting hold of this very thing. We do take care of the people if we have the complaints, but if we don't hear from them we don't get hold of them. It seems to me we take the gas and deliver it in good shape to the outlet of the meter, and then we stop. We are not developing the lighting business as it should be. The lighting business should be a larger end of the business to-day than it is. We pushed gas stoves and other devices, but we have neglected in a way to take proper care of the devices that are sold to the people for producing light.

Mr. Slade—Has Mr. Crafts figured on the average sales per lamp per year, and following that what his cost per 1,000 cubic feet of gas sold is.

Mr. Crafts—I have not with me the cost per 1,000 feet. I meant to have brought the figures on the output, I neglected to put them in my pocket, but they run something like this. The output for grocery stores, clothing stores and shoe stores which are open 2 nights per week ran somewhere about 14,000 feet per lamp per year. Drug stores run about 18,000 to 19,000 feet. Saloons and pool rooms ran from 25,000 to 27,000 feet. Of course it is plain to be seen that those places are open 6 nights in the week.

Mr. Gardiner—I was very much interested in reading Mr. Gifford's paper in advance of the meeting, and was very particularly interested in Mr. Crafts' remarks. It seems to me Mr. Gifford's paper is along the right lines, and I think Mr. Crafts is to be congratulated upon having taken what seems to me the advanced attitude which he has taken in this problem. I realize that almost all of us cannot possibly afford, under present conditions and the general trend of earnings, to take this attitude of furnishing complete service, but I think it is a thing toward which we should work. I am afraid we have not recognized that our electric light competitors have scored one on us on the question of maintenance of lighting facilities. Many years ago they started with the idea of giving complete service. They did not end at the meter. We used to end years ago at the meter. Now we are working into the complete service idea. We cannot afford to furnish complete installation and maintenance under present conditions, but I think it is a thing that we should work toward. We ought to try and develop toward complete service right up to and including the burner, and see that not only our gas is made right, distributed right and measured right, but that it is burned right, so that the customer gets what he is really after, whether it be light, or heat, or power, it is our ultimate best interest to see that our customer gets the complete service, the real thing that he is paying his money for. I want to lay particular emphasis on the fact that we cannot afford to do that generally now, but I think that is the thing we ought to have in mind to work toward, instead of allowing our earnings to be reduced, is to put whatever possible increment we can lay our hands on into the perfection of our service, put it in the hands of the customer, not at a reduced price, but in an improved service, so that we will have more generally satisfactory conditions.

Mr. Addicks—I have been very much interested in the discussion of Mr. Gifford's paper, and particularly interested in the experiments at Pittsfield. I presume the attention of the Accounts Committee should be called to this new feature of expense of distribution, which may be a very important one, and some day, when someone criticizes Pittsfield for an increase of cost of distribution, there will have to be an explanation made that they are doing something different from someone else, so that the Accounts Committee will have something to figure on in that respect. Of course, the more we do for the consumer, and we are very willing to do it within the power of the financial condition of the company, the higher the cost of distribution will be for any company. My personal theory is not exactly on the line of some of the gentlemen who have spoken. I rather feel that, aside from the manufacture and distribution of gas, in other words, after leaving the meter, outside of the ordinary flat flame burners, which are usually, I think, to-day furnished and sometimes installed free of charge, a charge should be made. When it comes to mantle lighting the service should be furnished as near the cost of service as possible, and thus not have that service an additional charge on the distribution system. We are endeavoring to work that out in New York, but in the case of New York we have a separate company and a separate organization for that purpose. The company has to pay rent, and it has to pay the proper superintendence to take care of that business. In spite of what is said regarding the small cost of maintenance, I think we have a clearer idea of what the actual cost of such a service is. Of course, one must always differentiate between the locality and the cost of labor. Another feature is the character of the people in the use of the appliance. There are other elements that enter, such as the demand of the people for the better class of service furnished. We would not be satisfied with two inspections a month, much less with one inspection a month. Our rule was heretofore four inspections a month, but our contract required three inspections a month, and we give at least three in all cases. The maintenance of arc lamps has been our special care up-to-date. We have test installations in all our offices to see what can be done with single mantle inspections, and my personal theory and hope have been that the mantles might be maintained under a contract for the cost to the consumer of the purchase of the mantles in the shops or in the offices of the gas company, where they are sold at a very low figure, the slight difference paying for the cost of the employees in installing them. The importance of the business with us is well illustrated by some figures I asked for within two or three weeks. I don't recall the detail, but it was to the effect that outside of Boston, Springfield, Cambridge, Fall River, Lynn, Lowell, Lawrence, and one or two others which I perhaps have omitted, our gas arc business exceeds the business of any company in Massachusetts, so that this is a matter of considerable importance. In the case of gas ranges, we rent our gas ranges for 1 cent a day. It is not with the idea of making money on the gas ranges, but merely to take care of those gas ranges, the interest, depreciation and repairs. The consumer has the service of the company at any time to keep the range in repair. But keep it at absolute cost, and then it is not a charge on the distribution system in the end.

The President—We thank you for those very valuable suggestions.

Mr. Walker—You have had cited to you a liberal policy. Perhaps you will be interested in knowing what we do, which is undoubtedly the other extreme. We rent gas arcs, on an agreement to keep them 1 year, and we charge 50 cents per month, with a monthly inspection, and nobody complains.

Mr. Slade—In line with several remarks here, I would like to say that the Hartford Company has about 2,100 or 2,200 arcs out on a free installation and maintenance basis. Our experience goes over a period of a little over 4 years, and on account of this paper I prepared some figures before I left home. Without going into the details of cost, the total cost of materials and labor for maintaining an average of 2,084 lamps for the year was $3,209.32. From that we got a credit for 410 ounces of mantle ash and 20 pounds of scrap brass, $84, leaving a net cost of material of $3,125.32. The depreciation charge amounted to $2,105.88, and interest on the investment $584.94, a total of $5,816.14. The maximum number of arcs in use was 2,183, the minimum number 1,933, and the average number 2,084. We had 3 lamps destroyed during the year. The total number of inspections (that is, regular biweekly inspections) was 54,184, and special inspections (that is, on complaints and a few lamps we looked after weekly) 1,560, a total of 55,744 inspections. The average cost per arc per year was $2.79. The average cost per arc per month was 23¼ cents. The estimated consumption per lamp per year is 15,000. That is a little bit conservative, I am afraid. On that basis the cost per 1,000 cubic feet sold is as follows: For labor and materials, 9.997 cents; for depreciation, 6.736 cents; for interest, 1.871 cents; a total of 18.6 cents per 1,000 cubic feet of gas sold. That figure, when I struck it first, surprised me a little bit. It may be a little bit surprising to others.

The President—Thank you, Mr. Slade. Mr. Prichard?

Mr. Prichard—In passing, the thought came to me as to whether or not the question of free maintenance was not a rather serious proposition. Mr. Addicks touched on it and Mr. Slade developed certain features of it. If I carry the figures in my mind as the gentlemen have expressed it, they are selling something like 15,000 to 20,000 feet of gas to a mantle lamp, and for the benefit of that consumer they contribute service amounting to 15 to 20 cents per 1,000 feet. In other words, they are creating a class of consumers to whom they sell gas for 20 cents less per 1,000 than they sell to their regular customers. That is a matter which should not be lightly dealt with, otherwise it may give cause for complaint by the regular consumers. In the case of the electric companies, where they furnish free renewals for all current which is used in lamps, it is an entirely different proposition, but in this case you are creating, if I follow it rightly, a favored class of consumers, to whom you make a lower price.

Mr. Addicks—I want to emphasize that. While starting perfectly innocently, it becomes a matter of rebate and discrimination.

The President—The point raised is an interesting one. Discussion cannot but be profitable, because the stronger some of these things are impressed on our minds the less liability there is of making a slip that might prove costly in the end. Would that we had among our members a legal expert.

Mr. Barnes—Possibly the experience of Cambridge in the matter of arc lights may be of interest to some members of the Association. In the fall of 1905 a very good friend of mine, and he showed it by his action, sent me a circular which was issued by the Nernst lamp people and in that circular they spoke of the large installation of Nernst lamps in the city of Cambridge. It was news to me, but I sent a man out to inquire. He found that while there was a certain amount of Nernst lamp business going on in Cambridge, it had not reached anything like the dimensions which this circular gave, and the question was put up to us how to meet the competition. We found that the Nernst light was installed free of charge absolutely, and they agreed to keep it in repair for a year. At the same time they compelled the consumer to sign a contract agreeing to use it for a year. That was the competition which we were up against. We started in by installing an arc light on approval. The man could use it for 30 days, and if at the end of 30 days he was satisfied with the light he was to buy the lamp. We sold the lamp at very little over cost and agreed to keep it in repair free of charge. After two or three installations that kind of business began to spread, and, up to January 1, 1908, we have introduced 576 arc lamps on that basis. Of course, the question of cost is what we want to find out, and during the past year we have kept a very careful account. I have only brought in a summary of the general result, which I will give later. The individual results I have not had time to analyze and give any extremes as to smallest cost, or lowest cost, or anything of that kind. The service is giving very good satisfaction, and I think if anybody cares to wander through the principal streets of Cambridge after dark he will be considerably sur-

prised to see the large amount of arc lighting which is being done in our stores. We have recently made one installation of over 100 inverted lights, in a factory where the proprietors have heretofore used electricity. One of these inverted lights is put over each bench. The installation was put in on the understanding that they were to pay for the lamps, and if they were not satisfied after a fair trial that the amount of light which they were getting was at a cost less than it cost them to light by electricity, we would then take up with them the question of maintenance of the lamps. The factory has been running 3 months, and the question has not been brought up to us yet. The figures in regard to the expense of maintenance of the arc lights are as follows: I have divided the installation during 1907 in such a way that, as nearly as possible, it would average for the entire year 419 arc lamps in use, and the total cost for mantles and maintenance has been $1,546, an average of $3.70 per year per lamp. That includes everything, labor, mantles and shades where they have been broken. Our arrangement with the consumer is that he is to notify us at any time when his lamps are not giving satisfactory light, and on receiving notice from him attend to them. The consumption of gas, by customers who are using the 419 arc lights, for the year 1907, was 14,181,000 feet, which, at our net price of 90 cents for gas, brings in a gross revenue of $12,762. Of course, I cannot say that all that consumption is on arc lights. Very likely it is not. Very likely some of it is on flat burners or single mantle burners; but it is satisfactory as showing, to my mind, that we are holding that amount of business which we were in serious danger of losing if we had not undertaken this installation of arc lights.

The President—Our best thanks, Mr. Barnes, for your weighty addition to what has been said. I am also glad to see that one electric sinner is returning to gas lighting again. If there is nothing more to be said on this subject we will proceed to the discussion of another question.

Mr. Morrison—I think the Association appreciates the Secretary's paper and the valuable discussion it has brought out, and I move that our thanks be extended to him for it. [Seconded.]

The President—It is moved and seconded that the hearty appreciation of the Association be tendered to our Secretary for his very valuable contribution on the matter of incandescent lighting. [Adopted.] Mr. Secretary, I take a great deal of pleasure in tendering the thanks of the Association to you.

(To be Continued.)

Public Service Commissions.

[An address delivered by MR. CHARLES H. DICKEY, of Baltimore, Md., at the Fourth Meeting of the Illinois Gas Association.]

"*A function to each organ, and each organ to its own function, is the law of all organization.*"

You must naturally gather from these words that every organization that is made possible by man can best be conducted by those who are skilled, by study and application, to carry on the various works assigned to man. You who are gathered here represent, own or control public service corporations, and the fact that you have come here these last few days makes your deliberations important, because you have been considering such matters as would best serve the interests of your industry; and during all your deliberations no one present can help keeping in mind those laws which naturally govern the individual and corporate rights.

Each man, with a true idea of the work that is laid out before him, must in all things recognize the supremacy of the law. Your gatherings take on, so-to-speak, the nature of mutual benefit and protection by the interchange of thought, one to another; and is it not a natural result, from time immemorial, even when your earliest settlers upon these shores of Lake Michigan came together for benefit and protection, was it not found necessary at stated times to make such laws as were fitting and adequate to their wants and needs?

It is a most potent fact, and one that should be continually borne in mind by everyone, that man is not the creature of the law, but that the law is the creation of man. Man stands alone in his power and ability to create. "The progress of the whole world and all that goes to make up our complicated existence, center around individual man, who has done the work and has been the source of all advancement from the beginning of the world. The distinction of a soundly constituted man is his labor, and of that no State has the right to rob him."

Glance over the nations of the world, and what do you find? You find that where individual man has been allowed the widest latitude and freest play for his genius and energy *there* has been the greatest progress. It is unnecessary for me to argue from any other point of view, because you can look back through history, and wherever you find a contrary situation you find disaster; therefore, as man has gone on from the beginning, through the evolutions of life from the earliest ages to the present time, laws have been made, but such laws only as are necessary for the protection of property, and the proper conduct of affairs as they present themselves.

Why, therefore, let me ask you, should you endeavor to make it possible that other laws which are entirely unnecessary should be created, which, to my mind, would curtail your rights and privileges, laws that would heap untold trouble and expense upon your corporations when, by your own acts and progress in your dealings in connection with your organizations, you can make such unnecessary?

"It is not a fact that conduct in your affairs, conduct in your living, conduct in your dealings with man, is to be ruled either from within or without? If the rule from within is not efficient, there must be the necessity of supplementary rule from without; but if, on the other hand, my dear friends, all men are properly ruled from within, what is the result? The result is that government becomes needless, and all men are perfectly free."

This is, of course, ideal, but it implies much.

"We may not carelessly abandon our dues, nor may we give away our birthright for the sake of peace." We have a duty to perform and a mission to fulfill, and must it be continually said that it is a well known fact that men are still selfish; must we always admit that, directly or indirectly, if not openly, then in secret, their private needs will be served? Are we always to believe that those who possess authority in our corporations will, if permitted, use it for selfish purposes?

It seems to me that it is the pride of your situation that should make such things impossible, that should spur you to such conduct of business affairs that your corporations would be looked upon with that respect which you so earnestly desire. There should be no petty, underhand dealings with any subject that is of vital importance to yourselves and to the community: "And it is the duty of public service corporations clearly, if they wish to succeed, to call a halt to the advancement of the municipalities; they must, once and for all, nail to the counter the lie that they extort unfair profits out of the public, and also fail to perform good service." It has always seemed to me that there is room enough, and to spare, for the fullest display of civic virtue and devotion, like business acumen, within recognized boundary of municipal work, without going beyond it.

In dealing, my friends, with the subject of public service commissions, I am opposed to any State establishing such commission, because it not only puts a limited construction upon your operations and ambitions, but it destroys individuality, the initiative, and self-reliance, and the proper sense of responsibility on the part of owners and managers of public service corporations. Furthermore, it restrains, defines and oppresses your operations and ambitions, and also creates a burden upon the taxpayers of the community which is entirely unnecessary.

Can anyone present advocate public service commissions with any feeling of security that he would benefit thereby? Is it not a fact that such commissions—however honest and sincere they may be—take up subjects that, in the development and progress of good business, should undoubtedly be let alone? They draw a hard-and-fast line which often in cases is unjust and unsatisfactory to all concerned. They will substitute mediocrity and want of skill for experience, ability and discipline in the management of corporate interests and the promotion of best service for the public; they are forced by the very position they occupy to lay down certain rules from certain standpoints, which even some of your brainiest and ablest members here present would not feel capable of fully handling. They seem to drive out the ambition that creates capital and makes your institutions a success, not only for the stockholder who is represented in your undertakings, but also for the consumer and user of the product of which you have to dispose.

In all these public service corporations there are large and comprehensive interests, take it from any point of view your wish; you have your large and small stockholders, thousands of citizens dependent for their daily bread upon your enterprises, a working organization which suffers disaster if its methods are disturbed; and is it fair, just or equitable that these great institutions should be under the direction or control of a body of men appointed by your government oftimes through political influence?

Stop and consider, if you will; and I ask if you have seriously considered what this all means, what questions the commissions would impose upon you to answer, what standards they attempt to set up for your work; and if you have seriously considered these matters, let me ask you in all earnestness to what conclusions you have come?

Does it not seem a pity that there should be any necessity for any agitation for such commission? Have you not established through-

out this broad land a standard of weights and measures, and are not your gas institutions throughout the country—especially your larger American Gas Institute—striving to produce by their efforts a standard for the conduct of public business; and does it not seem a shame that there should be a local commission in any State undertaking to make a standard for one locality, which could not possibly serve its purpose in another locality under a similar commission?

Is it not far better for you to work for a common cause, work for a standard that will have national importance, a standard that can be established for the benefit of all, principles that can be laid down for your true guidance in the conduct of your affairs? Is it not, I say, better to work for this purpose, with the dignity that your office demands, than to have restricted and almost withering constraint of a suppressing commission? "If it is a duty to respect other men's claims, so also is it a duty to maintain your own."

Can you make it possible, as I have stated before, by the conduct of your business affairs, to make such laws as those creating public service commissions unnecessary? You are living in an age of progress. You are living with the thought growing in the minds of all that your neighbor is not wholly dishonest; you are honored citizens of your native land, and you must by force of the position you occupy demand respect from the citizens of your community. How long, if such is not the case, can you stand public criticism and condemnation? It makes no matter how strong a man's will or what nerve he may possess, he will feel the galling and unkind comments made upon his character. If his treatment of the public is not fair and equitable, his inner conscience will undoubtedly bring him to the bar of justice, and it is one of the most unfortunate things in connection with public service corporations that there has grown or has been allowed to grow a feeling of distrust which is entirely unnecessary.

You all know that the press is a very potent factor in your native cities. You have all felt sometimes the unkind and ofttimes erroneous statements made by them. Is it not likely your fault or the fault of both that such things exist? I will grant that sometimes, unfortunately, it is caused by political influence; but in your conduct of such affairs can you not have such facts presented as will make such statements impossible, so that there will be unbiased, fair and honest reports which will assist you in completing this work, and moulding public opinion for your benefit. But, mark you, gentlemen, this work cannot be done unless, behind all, your intentions are good and your methods honest.

If anyone should say that I am in error in the position that I take against public service commissions, let me assume for a moment that this would be the proper undertaking. What will you accomplish and how will you accomplish it? Are you quite sure that the apparatus will not drag down under its work? Are you quite sure that it will produce the results you wish? Are you quite sure that it will not produce some very different results?

"There is no lack of warning—look at the administrative mechanism—can you swear for the satisfactory working of that? A common remark that public business is worse managed than all other business is not altogether unfounded—there are the grossest illusions in the belief in the sovereign power of political machinery; educate the people to believe in government omnipotence, and they will be pretty certain to get up revolutions to achieve impossibilities. What they believe on the one side, with what is done on the other, is very sure to engender feelings of disappointment, and the further it is carried the larger becomes the revenue required, and we all know that heavy taxes result from disorganization."

"No, gentlemen; in such government by commissions you cramp men, you diminish their labor; and the commission galls by its restrictions, offending by professing to help those whom it will not allow to help themselves, and it vexes by acts of dictatorial officials, who must come between men and their pursuits."

Now, in conclusion, I want to add a few words for you to consider in connection with the subject of public service commissions. Do you wish to live under the law which protects not only the individual, but the corporate interests, which gives to every man alike, which leaves to ingenuity and ambition free sway and asks only that the law be respected by all, individual and corporate interest alike. Or are you to put yourselves in the position where you turn over to a commission the direction of your business affairs, which they can neither create nor bring to life, nor keep in any state of perfection, and which under the government of your State in connection with which there must be various changes from time to time in the personnel, you find new men with new ideas and different so-called reforms putting a limited construction upon the expansion and fulfillment of your work? The decision is in your own hands.

A New Type of Gas Heater.

By EDWARD S. BRADBURNE.

The gas heater described in this article is not very expensive to construct. It is economical in gas consumption, and is especially suitable for use in a private motor house, small greenhouse, or outside workshop.

Fig. 1 is a half sectional elevation or the heating pot, and Fig. 2 a view of the general arrangement. To construct one for a room, say 20 feet long by 12 feet wide and 7 feet to the eaves, the following iron gas-fittings are required, which can be obtained from any gas tube maker: One 3-inch elbow; three 3-inch nipples; 2 flanges, each 7½ inches in diameter, for 3-inch iron gas pipe; one reducing socket, 3 inches to 2 inches; one 2-inch normal bend; one piece of tube, 6 inches external diameter, 4 inches long [this is to have four 1-inch holes drilled in it as shown in Fig. 1]; one length of 3-inch pipe 3 feet long to screw into the elbow; one 3-inch cross piece; two 3-inch taper plugs, each to have a hole drilled through the center, and tapped ¼-inch brass gas thread; four ¼-inch bolts, each 5½ inches long, with nuts; two batswing burners, No. 4 Bray; two gas cocks; a small quantity of ¼-inch brass gas pipe. All the above are for the heating pot, as shown in Fig. 1.

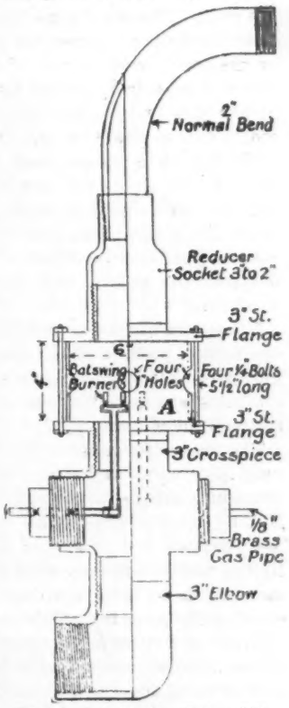


Fig. 1.—The Heating Pot and its Connections.

The following are required for the heating pipes: One 2-inch elbow; one 2-inch cross piece; one 2-inch nipple; two 2-inch taper plugs [one of these to be drilled through and tapped ¼-inch brass gas thread for the syphon drain pipe]; two lengths of 2-inch pipe, each with a running coupling, and back-nut at the one end, and screwed for a distance of 1½ inches the other end; one piece of 2-inch tube, 11 feet long, with a coupling on one end, and one piece 6 feet long screwed one end only.

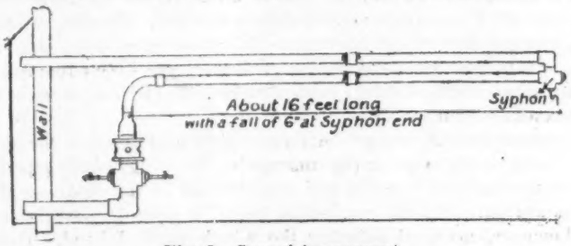


Fig. 2.—General Arrangement.

It will be noticed, when looking at Fig. 2, that the inlet for the air and the outlet for the gas fumes both pass through the same wall, and are covered by a wooden lean-to box. It is essential that the pipes be arranged as shown; if they are fixed in any other manner the apparatus will not work.

It will be seen from Fig. 1 that there are 3 gas burners in an iron box, two being controlled by one gas tap and the other by a separate tap. By this means it is possible to have 1, 2 or 3 burners alight at the same time.

I must warn readers not to fix bunsen burners on any account; they must be of the batswing type. No doubt some reader will remark, "What about the pipes sooting-up?" There will be no soot formed at all, providing the flame does not touch the iron; and to provide against this, the gas taps must be provided with stops, so that they can only be turned on enough for a flame, as large as possible, but not large enough to touch the sides of the iron box.

It is very important that the pipes slope downwards to the syphon pipe end; so as to allow the water which collects in the pipes to be drained out. A stove of the dimensions shown in the drawing will fill a bucket in about 50 hours. The ends of the pipes where they

1. *Journal of Gas Lighting.*

come outside the wall of the building should be covered over by a wooden box, with ten 1-inch holes bored at the bottom and ten at the top. If this box is near the window or door of a dwelling house, a ventilation pipe must be run vertically, so as to allow the gas fumes to escape some height from the ground.

There is one very important part of the heater which is not shown in the drawings, and being not very easy to define clearly I will try and describe it. It is very essential that, after the stove is lit, no air should enter except by means of the 3-inch pipe which passes through the wall. Therefore some means must be provided to close the four holes in the pot. After the stove is erected, the pot A must be laid on the bench, with a sheet of tin, 4½ inches wide, long enough to fold round it—the two ends being bent up at right angles and bolted together with two ¼-inch bolts, nuts and washers. This forms a sleeve which can be rotated round the pot.

Mark with a pencil inside the pot where three of the holes come. Take the tin sleeve off, and bore these holes. Replace the sleeve, so that the three holes coincide with the three holes in the pot. Then move the sleeve round so that the three holes are covered. Mark with a pencil the position of the fourth hole, which must be bored out like the others, and then covered with sheet talc to form a window.

Now place the pot in position with the sleeve on; and, of course, in one certain position of the sleeve the three holes are open for lighting purposes; but when the jets are lit the sleeve is turned round so that all holes are closed, while at the same time the flame can be seen through the window.

The reason for these holes is this: It may happen that there is a very high wind, and if only one hole was provided for lighting, the draught would be so concentrated that it would blow the match out. But by having three holes the pressure is released somewhat. It may happen, however, that the wind is strong enough to blow the lighted match out even with three holes. If so, the only method remaining is to open the door or window of the room and thereby equalize the pressure. This method never fails.

I will now give some figures of the working costs: The workshop where mine is fitted contains 2,700 cubic feet, has three outside walls, and no room above. The temperature of the room in the morning is, say, 32° F. Now each burner consumes 5 cubic feet of gas per hour, and is equal to 6° F. At the end of an hour, the temperature has risen to 48° F., and in two hours' time to 60° F. By night time, the temperature will rise higher than this; and if it does, the single burner is turned out. Taking gas at 63 cents per 1,000 cubic feet, the cost works out at less than 1 cent per hour. The thermometer is hung 10 feet away from the stove.

The reason for fitting a 2-inch cross-piece and plug on the end of the lower pipe is to allow (by unscrewing the plug) of the pipe being swept out (say) once in the spring and again in the autumn. If the pipes are painted with aluminum paint, it gives a smart finish. It is, however, no good painting the 2-inch normal bend. The two joints between the pot and the 6-inch flanges must be made air-tight by means of asbestos rings.

On the Recovery of Cyanogen Compounds in the Distillation of Coal and the Disposal of Effluents from Ammonia Stills.

The *Gas World* reports that a paper on the above subject, which is of particular interest to those engaged in the manufacture of coke and gas, was read by Dr. Grossman, of Manchester, at a meeting of the Yorkshire Section of the Society of Chemical Industry, held at Sheffield on the 18th ult. Dr. Grossman referred briefly to the method which he proposed two years ago for the working up of crude gas liquors, and which, whilst it accomplished the recovery of cyanogen compounds, aimed chiefly at the avoidance of the effluent which at present is produced from ammonia stills. As, however, the disposal of the effluents from ammonia stills does not in every works present insuperable difficulties, it need not necessarily go hand-in-hand with the previous elimination of the cyanogen compounds. For this reason Dr. Grossmann has designed two separate processes, one dealing with the recovery of cyanogen compounds from ammonia liquors and another dealing with the disposal of the effluent from the stills, and which may be worked separately or conjointly.

Dr. Grossman, in his paper, briefly discussed the processes of Bueb, Foulis and others, which aim at the extraction of the cyanogen compounds from the crude distillation products of coal in their *gaseous* state, and the complications introduced by the fact that double compounds of ferrocyanide were obtained which contained ammonia. He paid a high tribute to the work done by Mr. R. Forbes Carpenter, the chief inspector under the Alkali Acts, and his assistant, Mr. Linder, whose investigations had clearly shown that the cyanogen compounds evolved during the dry distillation of coal were in the state of prussic acid or ammonium cyanide, and were absorbed as such during the condensation of the gases. Fresh crude ammonia liquors, therefore, contain practically no other cyanogen compound but ammonium cyanide; sulpho-cyanide and ferrocyanide are secondary products due to the action of air. By treating the fresh liquors, as soon as practicable after condensation, with suitable iron compounds, Dr. Grossmann claims that it is possible, under the special conditions which he has worked out, to convert practically all the cyanide present into soluble ammonium ferrocyanide, without producing any of the objectionable insoluble double compound with ammonia. The crude ammonia liquor which has been subjected to this treatment passes through the stills in the usual manner, lime being used for the evolution of fixed ammonia as at present. The effluents contain ferrocyanide of calcium, which is precipitated by means of a suitable iron salt, and the iron ferrocyanide thus obtained worked into marketable sodium ferrocyanide at the works at which it is produced or sold to chemical manufacturers on the basis of the ferrocyanide which it contains.

Dr. Grossmann's second process deals with the disposal of the effluents, whether produced as at present or after extraction of cyanogen compounds. He found, by experiment, that under proper conditions these liquors have only slight corrosive action on iron. Attempts have been made to use them in steam boilers for steam raising, but the results have been unsatisfactory; the boilers deteriorated rapidly, and this was attributed to the action of the sulpho-cyanide present in the liquors. Dr. Grossman has, however, found that up to a pressure of 50 pounds to the square inch effluents containing even abnormal quantities of sulpho-cyanide show no corrosive action on wrought iron or steel. On the other hand, the effluents contain sulphate of lime in such a quantity as would, in itself, act injuriously on any boiler. Dr. Grossman, therefore, proposes to remove the sulphate of lime from the effluents by means of barium carbonate, which precipitates it quantitively. The liquors can then be used in boilers for steam raising; and the daily blow-offs, which would only amount to $\frac{1}{16}$ of the original bulk of the liquors, could be used for the recovery of other products, and evaporated to dryness in a small furnace. For the first process, that dealing with the recovery of the cyanogen compounds, it is claimed that it is not only valuable on account of the extra revenue which it will yield, but also for hygienic reasons, inasmuch as it prevents the evolution of highly poisonous prussic acid and its compounds in the distillation of the crude liquors. These seriously affect the health of the workmen, and may even lead to, and probably have led to, fatal consequences, which have been attributed to the action of sulphureted hydrogen and other gases. The process of rendering the effluents fit for use in steam boilers entails some expense; but worked in conjunction with the first process the profit derived from that process will fully cover the expense of the second process, and still leave a considerable margin of extra revenue.

An Improved Hygrometer for Determining the Minimum Temperature of Gas in Distribution Mains.[1]

[Communicated by Mr. C. C. Tutwiler, Philadelphia, Pa.]

In the distribution of illuminating gas, it has been found by repeated experiments that the gas will leave the works storage holder saturated with water vapor and also with the vapors of unfixed hydrocarbons, which latter contribute largely to the photogenic value of the gas. This condition of saturation is due to the fact that the gas reaches a temperature in the storage holder which is lower than any temperature to which it has been previously subjected up to this point, and it is, therefore, saturated with water and hydrocarbon vapors at the temperature of the holder. It has also been found that when the gas enters the relatively colder distribution mains some of these vapors will be dropped, the amount remaining saturating the gas at the lower temperature.

These vapors are unavoidably present. They are not vapors of the oil used in making the gas, but are high temperature products of the closed ring series of hydrocarbons formed by the heat necessary to break up the oil into permanent gas. The manner in which these

1. *Journal Am. Chem. Society.*

hydrocarbons are dropped out of the gas and again reabsorbed and the effect upon the candle power of the gas is an interesting study which need not be discussed at present, as it has only an indirect bearing upon the subject of this paper. It may not be out of place to say, however, that the aim of the gas engineer is to eliminate from the gas as many of the vapors of low tension high boiling hydrocarbons as possible and to retain those whose tension will permit of their being carried to the burner under all conditions of temperature and pressure met with during distribution.

It is evident that if the gas could be delivered to the consumer at a temperature equal to or greater than that obtaining in the storage holder, there would be no loss of light producing hydrocarbons in the mains, and the candle power of the gas delivered at the burner would be the same as that shown at the outlet of the storage holder. While this might seem to represent an ideal method of distribution, it is not practicable from an economic standpoint, as the temperature to which the gas is subsequently cooled in the mains during some seasons of the year is far below the outlet temperature of the storage holder, and the cost of reducing the gas to the temperature of the mains at these times would more than offset any advantage gained. It has been found that the gas in the distribution system quickly reaches the temperature of the earth surrounding the mains, and where the mains are exposed it may even be cooled to the surrounding atmospheric temperature. The attendant loss of hydrocarbon vapors and therefore loss in candle power is considerable, depending upon the so-called "permanency" of the gas and the degree of cold to which it has been subjected. Gases which owe a large percentage of their photogenic value to so-called unfixed hydrocarbon vapors will suffer a greater loss in this respect than those that contain a relatively greater amount of fixed hydrocarbons.

When, therefore, it is required to deliver to the consumer a gas of a uniform candle power throughout all seasons of the year, it is necessary to turn into the distribution mains a gas sufficiently high in candle power to take care of subsequent losses in the mains, which losses will vary from day to day.

The problem at once presents itself as how best to determine what this initial candle power should be, since any excess over and above that actually necessary, means financial loss to the gas company on account of extra enrichment or on the other hand may subject it to penalization if it should fall below that required by contract.

Since the loss in candle power is due to reduction in temperature of the gas in the mains, it will appear at once that the first thing to be determined in the above problem is the minimum temperature to which the gas will be cooled after it leaves the holders, and after having found this temperature to raise or lower the candle power of the holder gas to such an extent that when it is cooled down to the minimum temperature it will still have a candle power equal to that which must be furnished to the consumer.

It was found impossible to determine the minimum temperature by means of thermometers placed in the mains, as the gas continually changed in temperature, owing to its passage through more or less exposed portions of the mains, or on account of its being subjected to other conditions tending to change its temperature, such as rate of flow or nature of the ground through which the main passed. For these reasons the location of the point of minimum temperature by means of thermometers was found to be exceedingly difficult and unreliable and the attempt was abandoned. A method was finally evolved which depended, for its successful operation, upon the following data:

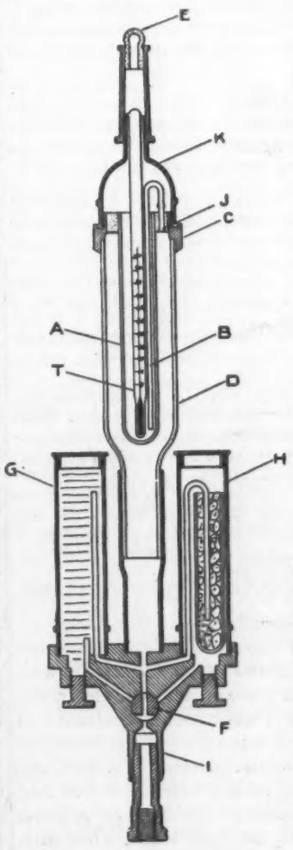
In the course of a series of experiments made in the Philadelphia Gas Works, it was found that if a gas was cooled down in contact with its condensate to a lower temperature than any to which it had been previously subjected and then allowed to warm up in contact with its condensate to within a few degrees of the original temperature, or, to its original temperature out of contact with its condensate, the water which it would then contain as determined by means of calcium chloride, would just saturate it at the minimum temperature to which the gas had been cooled. An explanation of this is found in the fact that if oil and water are simultaneously deposited the oil will form a film upon the surface of the water, preventing its being again picked up when the temperature is raised so long as any oil remains.

It appeared that advantage might be taken of this action and the minimum temperature which the gas had reached in the mains up to any given point be ascertained by determining its water dew point. For this purpose, an ordinary wet and dry bulb psychrometer was employed, the instrument being hung in a bell jar sealed in mercury, through which a current of the gas to be tested was continually passing. The dry bulb thermometer indicates the true temperature of the gas, while the wet bulb thermometer registers the temperature of evaporation, which is usually several degrees below the temperature of the gas. In saturated gaseous atmospheres, the thermometers will read alike and difference will be recorded in proportion to the dryness of the gas. The dew point may be obtained by means of these observations from Glaisher's table by multiplying the difference between the reading of the two thermometers by the factor opposite the dry bulb reading and substracting the product from the day bulb reading.

This instrument was given a thorough trial, and though it furnished some very valuable data, its lack of portability and the knowledge that under the best conditions its indications were known to be only approximately near the truth, caused us to continue our efforts to devise a more satisfactory apparatus.

It was suggested at this time by Mr. Chas. O. Bond, Chief Photometrician of the United Gas Improvement Company, that the instrument devised by Regnault,[1] known as the condenser hygrometer, might be adapted to our needs.

The essential parts of this instrument comprise a thin wall glass vessel quite similar in size and shape to an ordinary 15 cc. test tube, provided with a delicate thermometer and having means for passing air through a small amount of ether contained in the tube. Upon exposing the tube to an atmosphere containing water vapor and reducing the temperature of the tube by volatilizing the ether, moisture will finally be deposited on its outer wall. When this occurs the temperature is read on the thermometer, which reading is the temperature at which the atmosphere would be just saturated with the moisture contained therein, or in other words, its "dew point." The apparatus as designed by Regnault was intended to be used for the determination of the dew point of the atmosphere only, but its principles were successfully utilized in an apparatus which was found to be applicable to the determination of the dew point of any gas. This was accomplished by providing means for surrounding the vaporizing tube with the gas to be tested by the use of an outside jacket through which the gas was made to flow and providing scrubbers for the removal of hydrocarbon and water vapors, the use of which will be explained later on. In the first apparatus designed, air was forced through the ether by means of a rubber hand-pump, and it was found that at times when the dew point was very low, moisture would be deposited in the tube from the air and so cloud the ether that the deposit of dew on the outside of the tube could be seen only with great difficulty. This trouble was finally overcome by using a current of the gas being tested to volatilize the ether, and besides correcting the trouble, the cumbersome hand-pump was thus done away with. This and other improvements tending to compactness, resulted in the improved apparatus about to be described.



The construction and operation of the apparatus is are follows: The interior glass vessel, *A* known as the condensing tube, the thermometer *T* and the small tube *B* reaching to the bottom of the condensing tube by means of which the ether is volatilized are quite similar to the essential parts of Regnault's apparatus, and if this portion of the apparatus is detached from the jacket by unscrewing the collar *C*, it may be used in the same way as the Regnault apparatus for obtaining the dew point of the atmosphere. In order, however, to adapt it to our purpose, the glass jacket *D* was provided, through which a stream of the gas to be tested could be made to flow, surrounding the condensing tube in its passage to the burner. The course of the gas from the time it en-

1. "Ann. Chim. Phys." [3], 15, 129.

ters the inlet *I* until it issues at the burner *E* on top of the instrument, is as follows:

The cock *F* at the base of the instrument is so constructed that the gas upon reaching the same can be made to flow straightway into the jacket *D* or made to first pass through one or other of the two scrubbing vessels *G* and *H*. In either course it finally passes into the jacket *D* and surrounds the condensing tube *A*. It then passes through the hole *J* in the screw cap covering the jacket, and into the tube *B* which runs to the bottom of the condensing tube. The gas after leaving the condenser tube passes into the cap *K* and is finally burned at the burner *E*. If a few cubic centimeters of ether or other volatile liquids, such as pentane, are placed in the condensing tube the gas bubbling through will rapidly volatilize it, thereby reducing the temperature of the tube and causing a deposition of dew upon its outer wall as soon as the point of saturation is reached. As soon as this occurs, the thermometer is read and the dew point thus ascertained. It is obvious that the instrument may be placed on any convenient gas bracket and that a few moments will suffice for determining the minimum temperature to which the gas has been cooled, up to that point.

It has been found that the determinations made with the instrument under all ordinary conditions are very reliable. Cases arise, however, when in order to get a correct indication of the minimum temperature, it is necessary to make use of a rubber scrubber to remove some of the hydrocarbon vapors prior to testing the gas and more rarely to use a calcium chloride drying tube to remove a portion of the water vapor. For example, if the gas after having been cooled to its minimum temperature in the mains should pass through a section of main which for some reason was warmer and any liquid hydrocarbon was present in the main at that point, the gas would saturate itself at the higher temperature with hydrocarbon vapor and therefore the instrument would show the dew point of the water vapor which would correctly indicate the minimum temperature. If, however, the gas is first passed through the scrubber *G* which contains finely divided rubber, the hydrocarbon vapors will be removed to such an extent that the amount remaining will not saturate the gas before the dew point corresponding to the water vapor is reached. Such conditions are rarely met with in the distribution mains. It is well, however, as a precautionary measure to take both hydrocarbons and water vapor dew points, and if the hydrocarbon vapor dew point is found to be higher than the water vapor dew point, the latter should be taken as representing the minimum temperature.

Again, it is possible that the gas, having reached its minimum temperature, may warm up in contact with water vapor which has been introduced into the gas, as for example, in purifiers where steam is admitted for manufacturing reasons. Under such conditions the calcium chloride scrubber *H* must be used and the dew point of the hydrocarbon vapors taken as the minimum temperature.

It is a very simple matter to test the gas in all three ways—*i. e.*, direct, through the rubber scrubber and through the calcium chloride scrubber, and it has been found advisable in order to get a correct idea of what is taking place or what has taken place in the mains to frequently check the direct readings with readings made after scrubbing the gas.

Such observations also enable the gas engineer to judge whether the gas is being scrubbed by tar or heavy drips deposited in the mains or whether it is picking up hydrocarbons from the mains. If the gas has been cooled to a low temperature, as it might be in passing through an exposed main, as under a bridge, and afterwards warmed up in the ground, as previously stated, we would expect the hydrocarbon vapor dew point to be higher than the water vapor dew point. If the hydrocarbon vapor dew point is lower than the water vapor dew point, it would indicate contact of the gas with a deposit of tar or heavy drip oil.

The practical application of this instrument in gas distribution practice is well defined. Owing to its low specific heat, the gas flowing from the works quickly reaches the temperature of the surrounding earth. The gas engineer knowing by this instrument to what extent the hydrocarbon vapors have been dropped and what the consequent fall in candle power will be, is capable of anticipating the reduction in candle power by raising the candle power of the gas going into the holder accordingly.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

THE proprietors of the Beverly (Mass.) Gas and Electric Light Company have issued the following announcement: "In accordance with the custom of our Company to reduce the price of gas and electricity as fast as the condition of the business will allow, we are pleased to inform our patrons and the public that, at a meeting of our Directors held on April 1, 1908, it was voted that on and after July 1, 1908, the net price of gas be reduced from $1.30 to $1.20 per 1,000 cubic feet, and the net price of electric current for commercial lighting be reduced from 13½ cents per 1,000 watts to 12 cents per 1,000 watts, when bills are paid at the office of the Company on or before the 15th day of the month in which they are presented. The gross price of gas will be reduced from $1.50 to $1.40 per 1,000 cubic feet, with a discount of 20 cents per 1,000 feet, and the gross price of electric current will be 15 cents per 1,000 watts, with a discount of 20 per cent., instead of 10 per cent., when bills are paid on or before the 15th."

MR. WILLIAM H. HULSWIT, formerly Manager of the La Porte (Ind.) Gas Light Company, and later connected with the Mastico Manufacturing Company, of Niles, Mich., has been appointed Manager of the Stoughton (Wis.) Light and Fuel Company.

MR. F. SHELTON, Treasurer of the Suburban Gas Company, of Philadelphia, advertises that the Real Estate Trust Company, of Philadelphia, Trustee under the mortgage of the first named Company, to secure an issue of $2,500,000, first mortgage sinking fund, 5 per cent. gold bonds, due April 30th, 1952, will receive offers of said bonds for sinking fund account up to 3 P.M., April 30th, 1908, sufficient to absorb the sum of $17,010, at not over 108 and interest.

THE city of Northfield, Minn., has voted to investigate the cost of constructing a gas plant, to be operated on municipal account. The matter is in the hands of a special committee, of which the Mayor of Northfield (Mr. Horace Goodhue) is Chairman. He is the proper one to communicate with in the premises.

WE understand that Mr. Geo. A. Allen, formerly in the Commercial Department of the Niagara Falls (N. Y.) Gas and Electric Light Company, has been appointed Superintendent of the gas and electric plants of the Citizens Lighting Company, La Salle, Ills.

ON May 1st Mr. George L. Colgate, of Batavia, N. Y., will assume the management of the Ontario Light and Traction Company and of the Canandaigua Gas Light Company. His headquarters will be in Canandaigua.

MR. S. E. WOLFF has resigned the position of General Manager of the Saginaw City (Mich.) Gas Company to accept a responsible position in the New York city (or Chief) offices of Messrs. Hodenpyl, Walbridge & Co.

THE Los Angeles (Cal.) Gas and Electric Company has planned for the placing of 75 miles additional pipe to its existing main system. The additions will all be in territory not heretofore supplied with gas.

"T. F." sends the following under date of the 10th inst.: "The proprietors of the Danvers Gas Light Company have voted that, on and after July 1st, the net price of gas will be reduced from $1.80 to $1.70 per 1,000 cubic feet, when bills are paid at the office of the Company, on or before the 15th day of the month in which they are presented. The gross gas rate will be reduced from $2 to $1.90 per 1,000 cubic feet, with a discount of 20 cents per 1,000 when bills are paid on or before the 15th."

MR. L. N. RANCKE must have been "going further south" than usual at this time of the year. At any rate such conclusion is drawn from the fact that last week the Charleston (S. C.) Consolidated Railway, Gas and Electric Company awarded to the Baltimore Retort and Firebrick Company a contract for the placing of 6 benches of 6's.

AT the annual meeting of the Liberal Club, of Northampton, Mass., a feature of the session was an address delivered by Mayor Avery, of Holyoke, Mass., the burden of whose theme was "Holyoke's experience with municipal lighting." He said that Holyoke paid $1,300,000 for the gas and electric lighting plants and declared that at the present rate of progress in the business the plants would figure as unincumbered assets of the city in 1925. From now on they would certainly be self supporting and more. The gas rate had been reduced from $1.35 to $1 per 1,000 cubic feet, and the rate for arc electric lights in public illumination was $60 each per annum instead of $100. The rate for an electric supply on incandescent lighting account was at the very low figure of 6 cents the kilowatt.

ON the 7th inst. the term of Mr. Theodore H. Eaton, as City Gas Commissioner of Detroit, Mich., expired, and Mayor Thompson declined to appoint a successor. There is neither fee nor salary attached to the job, and the Mayor has not had his rest or ease at any time disturbed by the clamors or appeals of those who would succeed

Mr. Eaton. This office was created at the time when the authorities of Detroit were trying to persuade themselves into the certain knowledge that a municipally operated gas plant would be a good thing for Detroit.

FROM the second report of Mr. George W. Pepper, as Receiver for the Bay State Gas Company, of Delaware, it is shown that his total receipts were $1,414,428, and that his expenditures were $684,347.

MR. A. J. PATTERSON, President of the Meridian (Miss,) Light and Railway Company, states that the Company will go in for several miles of main extensions this summer. Provision has been made to extend the distribution system thoroughly through the district known as the South Side.

FROM the annual report of the Grand Rapids (Mich.) Gas Light Company it is shown that the gross earnings of the Company were $845,102.71. The expenditures were $626,080.65. In connection with the latter it is worthy of noting that the sum paid out on account of taxation (all sorts and conditions) was equal to 4.90 per cent. of the total receipts.

MR. H. A. CLAWSON, writing to us from Staten Island, N. Y., under date of the 10th inst., remarks that it is so odd to encounter credit given to a Gas Company by a local newspaper he felt impelled to send us a clipping respecting the New York and Richmond Gas Company, the lines of which are as follows: "The New York and Richmond Gas Company comes in for a good deal of popular abuse, as all supply corporations do, especially in this era of rather intemperate denunciation of the capital which makes general utilities corporations possible; but it is not to be denied that it has given remarkably good service at remarkably reasonable cost. When the Company was compelled by a law, presumably more or less wise, to reduce its charge per 1,000 cubic feet, it still maintained its rebate for prompt payment; and not long after it, of its own accord and without any influence whatever, still further reduced its price, while dropping the rebate system, which resulted in a net saving to the consumer; and it has continued to improve its plant and to keep up and enhance the quality of its output to an extraordinary degree. Mr. Thomas O. Horton, the General Manager, is not only an astute business man, but a gentleman of high education and culture, and the direct influence of a man of his character on the conduct of a delicate and trying business which has been built up from next to nothing, is a great agent for good to the entire community. The Company is in the hands of men of more or less the same sort in all its branches, and Staten Island is getting the benefit and it ought to recognize this."

THE Willimantic (Conn.) Gas and Electric Light Company, since the first inst., has been working on its new schedule, which lists gas for all purposes at $1.50 per 1,000 cubic feet, net. Heretofore gas for illuminating use was sold at $1.75 per 1,000, while the rate for gas used on fuel account was $1.25 per 1,000.

THE gas inspector for Chicago (Mr. W. B. Burke) still keeps testing the candle power of the gas that is being distributed by the Peoples Gas Light and Coke Company, only to find out that the illuminating value is well above the standard prescribed in the city ordinances.

WE are told that more trouble has arisen over the gas supply of Paulsboro, N. J., "some" of the authorities claiming that the contract for the plant is void, because it was issued after certiorari proceedings had been commenced to test the legality of the election at which the construction of the plant was authorized.

AT the annual meeting of the Fremont (Neb.) Gas and Electric Company, the officers elected were: President, L. P. Funkhouser; Vice-President, F. McGiverin; Secretary and Treasurer, L. E. Wettling; Manager and Assistant Secretary, W. B. Stark.

AT a recent meeting of the Directors of the Bay City (Mich.) Traction and Electric Company, Mr. B. C. Cobb was elected Vice-President, and Mr. John Collins was chosen General Manager.

"T. P. F.," writing from Fort Worth, Tex., under date of the 10th inst., says: "Some time ago the Fort Worth Light and Power Company held a practical demonstration series of lectures on how to read electric meters, and the unique display and outfit of apparatus at the office attracted quite a bit of attention and much favorable comment. The Company since then has installed a gas meter demonstration outfit, and this is attracting even more attention than the electrical exhibition did. The demonstration was also taken advantage of to show a good line of cookers, heaters, burners, etc."

ACTUAL construction work has been commenced on the buildings to house the artificial gas manufacturing plant that is to supply gas to the residents of Huntington, Ind., hereafter, instead of the natural article.

"WHAT do you think of this? It appeared in the Boston *Evening Globe* some evenings ago: 'Mrs. Alice G. Tuttle, who lives at 14 Temple street, was charged before Judge Murray with assault upon John W. Hayes, an Inspector for the Consolidated Gas Company. The story was that Hayes went to the house, being called to turn on the gas, which had been previously discontinued. Hayes, according to the statement he made to court, found that a chandelier in one of the rooms leaked, and thereupon refused to turn on the gas. He alleged that Mrs. Tuttle then become abusive, grabbed him by the collar, shook him severely and knocked him down. When he got to his feet she ran him out of the house. Mrs. Tuttle conducted her own case. She asked the Inspector if he was not under the influence of liquor when he called at her house. He said he was not. Then she said the Inspector was very rude to her, but that she did not assault him. A son and daughter of the defendant also testified that there had been no assault. Judge Murray, however, fined her $5, and upon her appeal she was held in bail for the Superior Court."

THE authorities of Winnetka, Ills., have granted to the North Shore Gas Company the right to supply gas in the territory under the former's control.

WHEN the municipality of Kingston, Canada, took over the works of the Kingston Gas Light Company, for operation on municipal account, the selling rate was put at $1 per 1,000 cubic feet, a reduction of 50 cents from the rate that ruled when the plant was owned by ordinary capitalists. The date of the take-over was July 1, 1907. Up to the 1st of April, 1908, it is figured that the works ran behind in its charges $3,000, with the prospect that the total for the year will be close to $4,000. The output there will amount to not over 12,000,000 cubic feet for the twelvemonth.

ONE of the prettiest show places in the retail or shopping district of Philadelphia is that maintained on appliance account by the Standard Gas Improvement Company. It is known as "The Bungalow," and thousands of people visit it each week.

THE acetylene gas plant of the South Deerfield (Mass.) Gas Company was blown to pieces by an explosion that unfortunately resulted in the loss of three persons, one of whom was Mr. John H. Ockington, President of the Company. The shock of the explosion was felt 15 miles away. The capacity was equal to the upkeep of 500 lights.

THE annual meeting of the United Gas Improvement Company will be held in its headquarters at Broad and Arch streets, Philadelphia, at noon of the 4th prox. The transfer books of the Company will be closed from 3 P.M. of Wednesday, April 22d, to 10 A.M. of May 5th. Secretary Douthirt's announcement rather goes to show that only routine business will be transacted.

MANAGER MCBRIDE points with pride to the fact that the Wichita (Kas.) Company, despite the financial oddities and stresses to which it has been subjected by some of its former "Directors," has over 13,000 consumers on its mains. And it looks that his pride is to a certainty justifiable.

MANAGER P. J. NEVINS, of the Haverhill Company, keeps hammering away on the proposition to establish a gas works for the supply of gas to the towns of Abington, Rockland, Whitman and South Weymouth, Mass. He estimates that the needed expenditure should not exceed $300,000, that sum to cover a main system of 35 miles. The field is there, and no better man than Mr. Nevins could be named to successfully till it.

THE New York State Court of Appeals early this month denied (with $10 costs) the application of the Trustees of Saratoga Springs, the Attorney-General acquiescing, for a reargument of the appeal in the action of the village against the Saratoga Gas, Electric Light and Power Company. The motion was made on the ground that the court had held that the 3-year limit for the enforcement of rates charged for gas and electricity was a valid limitation, and that it further held the State Gas and Electricity Commission act to be invalid because the statute went further and said that the rate should continue in force after 3 years and until a new rate should be made under the act, which new rate could only be made on the petition of the municipality or of consumer.

THE AMERICAN GAS LIGHT JOURNAL

A. M. CALLENDER & CO.,
PROPRIETORS.

THOS. J. CUNNINGHAM,
ELBERT P. CALLENDER,
EDITORS.

PUBLISHED ON EACH MONDAY OF THE YEAR AT
No. 42 Pine Street, New York.
Telephone, 2996 John.

TERMS:
SUBSCRIPTION—Three Dollars per annum, in advance, Single copies, 10 cents.

The JOURNAL is the official organ of the NEW ENGLAND ASSOCIATION OF GAS ENGINEERS.

MONDAY, APRIL 20, 1908.

The Market for Gas Securities.

The market for Consolidated gas was fairly steady last week, the net result in the trading being a loss of 1½ points. The transactions in it were heavier than for months past, and the shading off is undoubtedly due to profit taking, over the Easter holidays. During this interim the Hebraic element is usually inclined to ultra-conservatism. Look out for much higher prices in Consolidated, nor will one's eyes weary over the length of time they will be required on watch.

Brooklyn Union is very strong, and the same may be said of Peoples, of Chicago, although the stock is off one point nominally from the figures of last week. Cincinnati gas and electric has again crossed 90, and Massachusetts preferred is 86 bid.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

16 WALL STREET, NEW YORK CITY.

APRIL 20.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share:

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked.*
Consolidated	$78,177,000	100	118⅝	119
Central Union Gas Co.—				
1st 5's, due 1972, J. & J.	3,000,000	1,000	92	7
Equitable Gas Light Co.—				
Con. 5's, due 1932, M. & S.	1,000,000	1,000	—	105
Mutual	3,500,000	100	—	170
New Amsterdam Gas Co.—				
1st Con. 5's, due 1948, J. & J.	11,000,000	1,000	84	86
New York & Richmond Gas Co. (Staten Island)	1,500,000	100	37	43
1st Mtg. Gold Bds. 5 p. ct.	1,000,000	—	98	104
New York and East River—				
1st 5's, due 1944, J. & J.	3,500,000	1,000	100	105
Con. 5's, due 1945, J. & J.	1,500,000	—	97	101
Northern Union—				
1st 5's, due 1927, J. & J.	1,250,000	1,000	90	98
Standard	5,000,000	100	70	100
Preferred	5,000,000	100	100	125
1st Mtg. 5's, due 1930, M. & N.	1,500,000	1,000	100	105
The Brooklyn Union	15,000,000	1,000	110	150
1st Con. 5's, due 1948, M. & N.	15,000,000	—	91⅜	92
Yonkers	299,850	500	130	—
Out-of-Town Companies.				
Bay State	50,000,000	50	1	11-16
" Income Bonds	2,000,000	1,000	—	75
Binghampton Gas Works	450,000	100	—	65
" 1st Mtg. 5's	500,000	1,000	95	100
Boston United Gas Co.—				
1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	5	8
" " Bonds, 5's	5,250,000	1,000	63	66
Capital, Sacramento	500,000	50	—	35
Bonds (6's)	150,000	1,000	—	—
Chicago Gas Co. Guaranteed Gold Bonds	7,660,000	1,000	104	106¼
Cincinnati Gas and Electric Co.	29,500,000	100	90½	91
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	92	98
Columbus (O.) Gas Lt. & Heating Co.	1,682,750	100	87	88
Preferred	3,026,500	100	81	82
Consumers, Toronto	2,000,000	50	200	204
Consolidated, Baltimore	11,000,000	100	—	105
Mortgages, 6's	3,600,000	—	—	118
Chesapeake, 1st 6's	1,000,000	—	—	—
Equitable, 1st 6's	910,000	—	—	—
Consolidated, 1st 5's	1,490,000	—	—	112
Consolidated Gas Co. of N. J.	1,000,000	100	15	17
Con. Mtg. 5's	880,000	1,000	92	95
Bonds	75,000	—	—	100
Denver Gas and Electric	—	—	74½	75
Detroit City Gas Co.	6,000,000	50	—	50
" Prior Lien 5's	4,618,000	1,000	—	98
Detroit Gas Co., 5's	881,000	1,000	75	80
" Inc. 5's	16,000	100	98½	100
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	—	101
Essex and Hudson Gas Co.	6,500,000	—	39	40
Fort Wayne	2,000,000	—	—	—
" Bonds	2,000,000	—	55	—
Grand Rapids Gas Lt. Co., 1st Mtg. 5's	1,225,000	1,000	104½	105
Hartford	750,000	25	190	200
Hudson County Gas Co., of New Jersey	10,500,000	—	100	105
" Bonds, 5's	10,500,000	—	101	102½
Indianapolis	2,000,000	—	60	70
" Bonds, 5's	2,650,000	—	104½	105
Jackson Gas Co.	250,000	10	82	—
" 1st Mtg. 5's	250,000	1,000	97	100
Kansas City Gas Light Co., of Missouri	5,000,000	100	—	36
Bonds, 1st 5's	3,822,000	1,000	102	104
Laclede, St. Louis	10,000,000	100	97	97¼
Preferred	2,500,000	100	92¾	93
Bonds	10,000,000	1,000	104	104¼
Lafayette Gas Co., Ind.	1,000,000	100	—	60
Bonds	1,000,000	1,000	60	65
Louisville	2,370,000	50	143	145
Madison Gas & Elec. Co.				
" 1st Mtg. 6's	350,000	1,000	106	108¾
" 6 per cent. scrip, due 1910	100,000	25	60	60½
Massachusetts Gas Companies, of Boston	25,000,000	100	51	—
Preferred	25,000,000	100	86	—
Montreal, Canada	2,000,000	100	218	218¾
Nashville Gas Lt. Co.	1,000,000	100	110	—
Newark, N. J., Con. Gas Co.	6,000,000	—	56	58
Bonds, 6's	6,000,000	—	137	138
New Haven	2,000,000	25	200	—
Peoples Gas Lt. & Coke Co., Chicago	25,000,000	100	8 4/8	89¾
1st Mortgage	20,100,000	1,000	—	—
2d "	2,500,000	1,000	104	—
Rochester Gas & Elec. Co.	2,150,000	50	88	—
Preferred	2,150,000	50	118	—
Consolidated 5's	2,000,000	—	104½	105½
San Francisco, Cal.	15,500,000	—	—	—
St. Joseph Gas Co.—				
1st Mtg. 5's	751,000	1,000	92	—
St. Paul Gas Light Co.	1,500,000	100	45	47
1st Mortgages, 6's	650,000	1,000	113	116
Extension, 6's	600,000	1,000	112½	115
General Mortgage, 5's	2,465,000	1,000	96¾	—
Syracuse, N. Y.	1,378,000	100	50	55
Bonds	2,047,000	1,000	102	—
Washington, D. C.	2,600,000	20	307	310
1st Mortgage, 6's	600,000	—	—	—
Western, Milwaukee	4,000,000	—	—	—
Wilmington, Del.	600,000	50	230	—

Advertisers' Index.

GAS ENGINEERS. Page

Cruse-Kemper Co., Philadelphia, Pa. 684
Davis & Farnum Mfg. Co., Waltham, Mass. 695
Economical Gas Apparatus Construc. Co., Toronto, Ont. 695
Frank D. Moses, Trenton, N. J. 698
Frederic Egner, Norfolk, Va. 700
Frederick J. Mayer, Baltimore, Md. 681
H. M. Byllesby & Co., Chicago, Ills. 696
Humphreys & Glasgow, New York City. 696
Isbell-Porter Co., Newark, N. J. 684
Kerr Murray Mfg. Co., Fort Wayne, Ind. 697
The Gas Machinery Co., Cleveland, O. 680
The Jeffrey Manufacturing Co., Columbus, O. 694
United Gas Improvement Co., Philadelphia, Pa. 691
Western Gas Construction Co., Fort Wayne, Ind. 660

GAS WORKS APPARATUS AND CONSTRUCTION.

Connelly Iron Sponge & Governor Co., New York City. 693
Continental Iron Works, Brooklyn, N. Y. 698
Cruse-Kemper Co., Philadelphia, Pa. 684
Davis & Farnum Mfg. Co., Waltham, Mass. 696
Delly & Fowler, Philadelphia, Pa. 690
Economical Gas Apparatus Construc. Co., Toronto, Ont. 695
Frank D. Moses, Trenton, N. J. 698
Humphreys & Glasgow, New York City. 696
Isbell-Porter Co., New York City. 684
Kerr Murray Mfg. Co., Fort Wayne, Ind. 697
Lloyd Construction Co., Detroit, Mich. 686
Logan Iron Works, Brooklyn, N. Y. 700
Quintard Iron Works, New York City. 685
R. D. Wood & Co., Philadelphia, Pa. 698
Riter-Conley Mfg. Co., Pittsburgh, Pa. 683
Stacey Mfg. Co., Cincinnati, O. 699
The Gas Machinery Co., Cleveland, O. 680
The Jeffrey Mauufacturing Co., Columbus, O. 694
United Gas Improvement Co., Philadelphia, Pa. 691
Western Gas Construction Co., Fort Wayne, Ind. 660

PROCESSES.

Bartlett, Hayward & Co., Baltimore, Md. 697
Economical Gas Apparatus Construc. Co., Toronto, Ont. 695
Humphreys & Glasgow, New York City. 696
Semet-Solvay Co., Syracuse, N. Y. 694
The Gas Machinery Co., Cleveland, O. 680
United Gas Improvement Co., Philadelphia, Pa. 691
Western Gas Construction Co., Fort Wayne, Ind. 660

SCRUBBERS AND CONDENSERS.

Continental Iron Works, Brooklyn, N. Y. 698
Cruse-Kemper Co., Philadelphia, Pa. 694
Davis & Farnum Mfg. Co., Waltham, Mass. 696
Economical Gas Apparatus Construc. Co. Toronto, Ont. 695
Isbell-Porter Co., Newark, N. J. 684
Kerr Murray Mfg. Co., Fort Wayne, Ind. 697
Logan Iron Works, Brooklyn, N. Y. 700
R. D. Wood & Co., Philadelphia, Pa. 698
Riter-Conley Mfg. Co., Pittsburgh, Pa. 683
Stacey Mfg. Co., Cincinnati, O. 699
The Gas Machinery Co., Cleveland, O. 680
Western Gas Construction Co., Fort Wayne, Ind. 660

PRODUCER POWER PLANTS.

Economical Gas Apparatus Construc. Co., Toronto, Ont. 695
R. D. Wood & Co., Philadelphia, Pa. 698

TAR AND CARBONIC ACID EXTRACTOR.

Economical Gas Apparatus Construc. Co., Toronto, Ont. 695
Isbell-Porter Co., Newark, N. J. 684
Kerr Murray Mfg. Co., Fort Wayne, Ind. 653
Stacey Mfg. Co., Cincinnati, O. 655
The Gas Machinery Co., Cleveland, O. 686
Western Gas Construction Co., Fort Wayne, Ind. 660

AMMONIA CONCENTRATORS.

Michigan Ammonia Works, Detroit, Mich. 678
The Gas Machinery Co., Cleveland, O. 680
Western Gas Construction Co., Fort Wayne, Ind. 660

GAS METERS.

American Meter Co., New York and Philadelphia. 703
Detroit Meter Company, Detroit, Mich. 659
D. McDonald & Co., Albany, N. Y. 701
Helme & McIlhenny, Philadelphia, Pa. 703
John J. Griffin & Co., Philadelphia, Pa. 704
Keystone Meter Co., Royersford, Pa. 702
Maryland Meter and Mfg. Co., Baltimore, Md. 702
Metric Metal Co., Erie, Pa. 703
Nathaniel Tufts Meter Co., Boston, Mass. 702
New York Improved Meter Co., New York City. 702
Pittsburg Meter Co., East Pittsburg, Pa. 701
Rotary Meter Co., New York City. 679

PREPAYMENT METERS.

American Meter Co., New York and Philadelphia. 703
D. McDonald & Co., Albany, N. Y. 701
Helme & McIlhenny, Philadelphia, Pa. 703
John J. Griffin & Co., Philadelphia, Pa. 704
Keystone Meter Co., Royersford, Pa. 702
Nathaniel Tufts Meter Co., Boston, Mass. 702
New York Improved Meter Co., New York City. 702
Pittsburg Meter Co., East Pittsburg, Pa. 701

PREPAYMENT METER ATTACHMENTS.

New York Improved Meter Co., New York City. 702

WATER METERS.

Pittsburg Meter Co., East Pittsburg, Pa. 701

GAS AND WATER PIPES.

Davis & Farnum Mfg. Co., Waltham, Mass. 696
Donaldson Iron Co., Emaus, Pa. 688
Economical Gas Apparatus Construc. Co., Toronto, Ont. 695
R. D. Wood & Co., Philadelphia, Pa. 698

GAS COALS.

Berwind-White Coal Mining Co., New York and Phila. 694
Perkins Co., New York City. 694
Westmoreland Gas Coal Co., Philadelphia, Pa. 695

GAS MAIN STOPPERS.

Edward A. Behringer, New York City. 698
Safety Gas Main Stopper Co., New York City. 695 699

MAIN AND SERVICE LAYING.
Sullivan Bros., Flushing, N. Y. ... 695

GAS TAPPING MACHINES.
George Light, Dayton, O. ... 695
H. Mueller Manufacturing Co., Decatur, Ills. ... 686

CANNEL COALS
Perkins & Co., New York City ... 694

STOKING MACHINERY.
G. A. Bronder, New York City ... 693

CONVEYORS—ALL KINDS.
Brown Hoisting Machinery Co., Cleveland, O. ... 678
Cruse-Kemper Co., Philadelphia, Pa. ... 684
C. W. Hunt Company, New York City ... 696
Economical Gas Apparatus Construc. Co., Toronto, Ont. 695
G. A. Bronder, New York City ... 693
Kerr Murray Mfg. Co., Fort Wayne, Ind. ... 697
The Gas Machinery Co., Cleveland, O. ... 680
The Jeffrey Manufacturing Co., Columbus, O. ... 694
Western Gas Construction Co., Fort Wayne, Ind. ... 660

CHARGING BARROWS & COAL WAGONS.
Davis & Farnum Mfg. Co., Waltham, Mass. ... 696
Kerr Murray Mfg. Co., Fort Wayne, Ind. ... 697
Stacey Mfg. Co., Cincinnati, O. ... 699

GAS ENRICHERS.
Standard Oil Co., New York City ... 651

COKE CRUSHERS.
C. M. Keller, Columbus, Ind. ... 695
The Jeffrey Manufacturing Co., Columbus, O. ... 694

GAS METER CONNECTIONS.
H. Mueller Manufacturing Co., Decatur, Ills. ... 686

GAS COCKS.
H. Mueller Manufacturing Co., Decatur, Ills. ... 686

GAS GAUGES.
The Bristol Co., Waterbury, Conn. ... 685

GAS GOVERNORS.
Chaplin-Fulton Mfg. Co., Pittsburg, Pa. ... 699
Connelly Iron Sponge & Governor Co., New York City 693
Isbell-Porter Co., Newark, N. J. ... 684
Pittsburg Meter Co., East Pittsburg, Pa. ... 691
R. D. Wood & Co., Philadelphia, Pa. ... 698
Reynolds Gas Regulator Co., Anderson, Ind. ... 693

CEMENTS.
C. L. Gerould, Pittsburgh, Pa. ... 698

RETORTS AND FIREBRICKS.
Baltimore Retort and Firebrick Co., Baltimore, Md. ... 692
Didier-March Co., Baltimore, Md. ... 681
Gas Bench Construction Co., St. Louis, Mo. ... 682
Henry Maurer & Son, New York City ... 685
James Gardner, Jr., Co., Bolivar, Pa. ... 684
J. H. Gautier & Co., Jersey City, N. J. ... 682
Laclede-Christy Clay Products Co., St. Louis, Mo. ... 685
Missouri Firebrick Co., St. Louis, Mo. ... 684
Parker-Russell Mining and Mfg. Co., St. Louis, Mo. ... 688

INCLINED RETORTS.
Baltimore Retort and Firebrick Co., Baltimore, Md. ... 692
Didier-March Co., Baltimore, Md. ... 681
Gas Bench Construction Co., St. Louis, Mo. ... 692
Laclede-Christy Clay Products Co., St. Louis, Mo. ... 685
Parker-Russell Mining and Mfg. Co., St. Louis, Mo. ... 688

VERTICAL S'S.
Connelly Iron Sponge & Gov. Co. (Drake's [Eng.] System) 693
Didier-March Co., Baltimore, Md. ... 683
Gas Bench Construction Co., St. Louis, Mo. ... 692
Laclede-Christy Clay Products Co., St. Louis, Mo ... 685
Parker-Russell Mining and Mfg. Co., St. Louis, Mo. ... 688

REGENERATIVE FURNACES.
Baltimore Retort and Firebrick Co., Baltimore, Md. ... 692
Bartlett, Hayward & Co., Baltimore, Md. ... 697
Didier-March Co., Baltimore, Md. ... 683
Gas Bench Construction Co., St. Louis, Mo. ... 692
J. H. Gautier & Co., Jersey City, N. J. ... 694
Laclede-Christy Clay Products Co., St. Louis, Mo. ... 685
Missouri Firebrick Co., St. Louis, Mo. ... 694
Parker-Russell Mining and Mfg. Co., St. Louis, Mo. ... 688

SELF-SEALING MOUTHPIECE DOORS.
Continental Iron Works, Brooklyn, N. Y. ... 698
Davis & Farnum Mfg. Co., Waltham, Mass. ... 696
Isbell-Porter Co., Newark, N. J. ... 684
Kerr Murray Mfg. Co., Fort Wayne, Ind. ... 697
Logan Iron Works, Brooklyn, N. Y. ... 700
R. D. Wood & Co., Philadelphia, Pa. ... 698
Stacey Mfg. Co., Cincinnati, O. ... 699
The Gas Machinery Co., Cleveland, O. ... 680
Western Gas Construction Co., Fort Wayne, Ind. ... 660

INCANDESCENT GAS LAMPS.
General Gas Light Co., Kalamazoo, Mich. ... 692
Welsbach Company, Gloucester, N. J. ... 690

BURNERS.
Wm. M. Crane Co., New York City ... 688

STREET LAMPS.
Thos. T. W. Miner, New York City ... 688
Welsbach Street Lighting Co., New York and Phila. ... 690

DRILLS—ROCK AND STONE.
The Jeffrey Manufacturing Co., Columbus, O. ... 694

PULVERIZERS.
The Jeffrey Manufacturing Co., Columbus, O. ... 694

PURIFIERS.
Connelly Iron Sponge & Governor Co., New York City. 693
Cruse-Kemper Co., Philadelphia, Pa. ... 684
Davis & Farnum Mfg. Co., Waltham, Mass. ... 696
Isbell-Porter Co., Newark, N. J. ... 684
Kerr Murray Mfg. Co., Fort Wayne, Ind. ... 697
R. D. Wood & Co., Philadelphia, Pa. ... 698
Stacey Mfg. Co., Cincinnati, O. ... 699
Western Gas Construction Co., Fort Wayne, Ind. ... 660

(Continued on page 678.)

ANNUAL MEETING.

OFFICE OF THE UNITED GAS IMPROVEMENT CO.,
N. W. CORNER BROAD AND ARCH STS.,
PHILADELPHIA, April 16, 1908.

The Annual Meeting of the Stockholders of The United Gas Improvement Company will be held at the office of the Company, Northwest Corner of BROAD AND ARCH STREETS, PHILADELPHIA, Monday, May 4, 1908, at 12 o'clock, noon, when an election will be held for a President and six (6) Directors, to serve for the ensuing year, and such other business transacted as may be brought before the meeting. The stock transfer books will be closed from 3 P.M., Wednesday, April 22 until 10 A.M., Tuesday, May 5.

1715-2 W. F. DOUTHIRT, Secretary.

POSITION WANTED

By a man 36 years of age, at present employed. Has operated four different makes of water gas apparatus. Half depth, full depth regenerative benches. Foreman for the past 9 years for 2 extensive companies. Desires position where there is an opportunity for advancement. Nineteen years' experience.

1714-2 Address, "B. L. C.," care this Journal.

POSITION WANTED.

The advertiser wishes to obtain a position either as superintendent of a water or coal gas plant, or in a plant making both gases, or would accept a foremanship in a large works. Is thoroughly conversant with main and service laying, house piping, etc. Any required references can be furnished.

1715-2 Address, "W. B.," care this Journal.

POSITION WANTED.

F. R. Hutchinson, formerly commercial agent, southern division, Public Service Corporation of New Jersey, is open for engagement as gas manager or commercial agent. Eleven years' experience in various capacities in gas field has qualified him for any position, executive or otherwise, where economical management and quick results are desired. Best references.

1715-1 Address, "435 STATE ST., CAMDEN, N. J."

Position Wanted

By a well known gas superintendent, who has had 20 years' experience in the manufacturing and distribution of gas.

Address, "F. J. R.,"

17 5-2 Care this Journal.

Position Wanted

By married man with 15 years' experience in the manufacture and distribution of coal and water gas, as Superintendent or Foreman of gas works. Address, "M. M.,"

1715-2 Care this Journal.

WANTED,

Position as Manager or Superintendent of Gas and Electric Company,

In city of 20,000 to 50,000 population, by man competent to take entire charge. Strictly sober, energetic, thoroughly drilled in each department of operation and business, 36 years old, married, excellent references. At present superintendent of works of large Western gas company.

1715-4 Address, "W. R. S.," care this Journal.

Position Wanted
AS FOREMAN.

Thoroughly understands the operation of recuperative benches. Has had 15 years' experience in construction and operation of plants.

1715-1 Address, "A. W.," care this Journal.

WANTED,

Superintendent for Coal Gas Works.

Middle aged man who is practical and understands coal gas works as well as street work of all kinds. Must have experience in dealing with customers.

1714-tf Address, "I. C.," care this Journal.

WANTED.

Two Coal Gas Stokers and Two Helpers.

Twelve-hour shifts. Stokers' wages $75 and helpers' $60 per month.

CALUMET GAS COMPANY,
1713-tf LAURIUM, MICH.

WANTED,

Solicitor for General Work.

Must be familiar with standard appliances and able to estimate piping work. Advise as to experience and salary expected.

1713-tf CALUMET GAS CO., Laurium, Mich.

WANTED,

Combined Gas, Electric Light and Power Property

In city of not less than 20,000 population. Address, "BOX 150,"

1714-3 Care this Journal.

WANTED,

One Good Second-hand 6 inch or 8-inch Gas Exhauster Complete.

Inquire of

STANDARD GAS AND ELECTRIC CO.,
1707-tf RALEIGH, N. C.

FOR SALE,

One 15-Horse Power Beggs Steam Engine and **One No. 7 Sturtevant Blower,** in first class condition. A good unit for a water gas set. Address,

NEW YORK AND RICHMOND GAS CO.,
1714-2 STAPLETON, N. Y.

FOR SALE.

FOUR SECOND-HAND PURIFIERS.

Dimensions, 10 feet by 14 feet by 3 feet deep, with dry center valve and connecting pipes 10 inches diameter. Seal 16 inches deep. Inquire of the

DAYTON GAS LIGHT AND COKE CO.,
1697-tf DAYTON, O.

FOR SALE,

One 8-Horse Power Horizontal Engine, cylinder 5 inches by 12 inches, steam pressure 60 pounds.

One 10-Horse Power Vertical Tubular Boiler, 42 inches diameter, 7 feet long, 81 2-inch tubes, Crosby Pop Safety Valve; 4-foot 8-inch stack, with bonnet, 90 pounds pressure allowed.

One No. 4 McKenzie Exhauster for 10-inch connections. Address,

1710-6 TAUNTON GAS LIGHT CO., Taunton, Mass.

FOR SALE,

Two New No. 9½ Green Horizontal Gas Exhausters or Blowers. Capacity per revolution, 55 cubic feet; 20-inch connections.

Two Second-hand No. 9B Green Horizontal Gas Exhausters or Blowers. Capacity per revolution, 45 cubic feet; 16-inch connections.

For particulars, address, SEMET-SOLVAY COMPANY,
1711-3m Syracuse, N. Y.

FOR SALE,

One 7-foot American Meter Co. Station Meter, with 12 inch connections. The meter was built in 1896, and is in first-class condition.

Three Cast Iron Purifying Boxes, 21 feet by 21 feet by 4 feet deep; seal, 30 inches deep.

One Traveling Crane (track on floor), with oil pump and fittings complete, and 12 inch pipe, valves and fittings for a 3-box system complete.

Address, GEO. LIGHT,
1715-tf DAYTON, O.

(Concluded from page 677.)

PURIFYING MATERIALS.

Connelly Iron Sponge & Governor Co., New York City 693

VALVES.

Continental Iron Works, Brookln, N. Y. 698
Davis & Farnum Mfg. Co., Waltham, Mass. 696
Economical Gas Apparatus Construc. Co., Toronto, Ont. 695
Isbell-Porter Co., Newark, N. J. 684
Kerr Murray Mfg. Co., Fort Wayne, Ind. 697
Ludlow Valve Manufacturing Co., Troy, N. Y. 695
R. D. Wood & Co., Philadelphia, Pa. 698
Stacey Mfg. Co., Cincinnati, O. 699
The Gas Machinery Co., Cleveland, O. 680
The P. H. & F. M. Roots Co., Connersville, Ind. 687
Western Gas Construction Co., Fort Wayne, Ind. 660

EXHAUSTERS.

Connelly Iron Sponge & Governor Co., New York City 693
Connersville Blower Company, Connersville, Ind. 678
Davis & Farnum Mfg. Co., Waltham, Mass. 696
Isbell-Porter Company, Newark, N J 684
Kerr Murray Mfg. Co., Fort Wayne, Ind. 697
Piqua Blower Co., Piqua, O. 696
The P. H. & F. M. Roots Co., Connersville, Ind. 687

PURIFIER AND SCRUBBER TRAYS.

Cabot Mfg. Co., Hoboken, N. J. 695
Western Gas Construction Co., Fort Wayne, Ind. 660

GAS STOVES.

American Meter Co., New York and Philadelphia 703
Fred. K. Wells Company, New York City 682
Keystone Meter Co., Royersford, Pa. 702
Maryland Meter & Manufacturing Co., Baltimore, Md. 702
Nathaniel Tufts Meter Co., Boston, Mass. 702

HOT WATER HEATERS.

Humphrey Co., Kalamazoo, Mich. 701

GASHOLDERS.

Bartlett, Hayward & Co., Baltimore, Md 697
Continental Iron Works, Brooklyn, N. Y. 698
Cruse-Kemper Co., Philadelphia, Pa. 684
Davis & Farnum Mfg. Co., Waltham, Mass. 696
Deily & Fowler, Philadelphia, Pa. 700
Economical Gas Apparatus Construc. Co., Toronto, Ont. 695
Kerr Murray Mfg. Co., Fort Wayne, Ind. 697
Logan Iron Works, Brooklyn, N. Y. 700
R. D. Wood & Co., Philadelphia, Pa. 698
Riter-Conley Mfg. Co., Pittsburgh, Pa. 683
Stacey Mfg. Co., Cincinnati, O. 699
Western Gas Construction Co., Fort Wayne, Ind. 660

STORAGE TANKS.

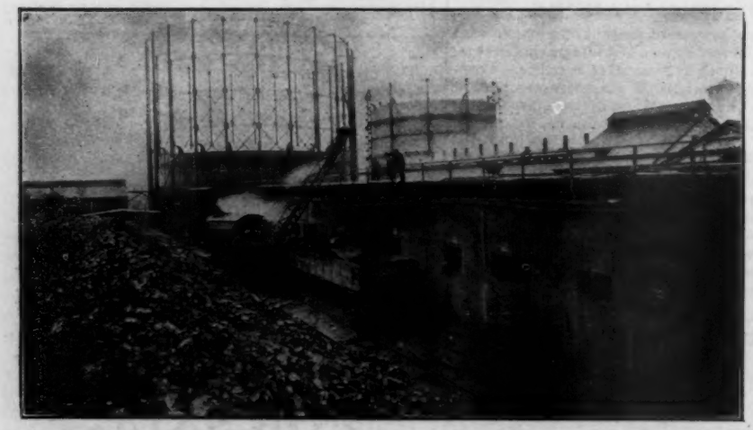
Davis & Farnum Mfg. Co., Waltham, Mass. 696
Stacey Mfg. Co., Cincinnati, O. 699
Western Gas Construction Co., Fort Wayne, Ind. 660

PATENTS, TRADE-MARKS, COPYRIGHTS.

Royal E. Burnham, Washington, D. C. 699

Utilize Your Gas Liquor.
NO EXTRA LABOR OR OPERATING EXPENSES.
IMPROVED AMMONIA CONCENTRATOR.
About 100 in use. Write to
STROH & OSIUS, Patentees, or
MICHIGAN AMMONIA WORKS, - Detroit, Mich.

Gas Engineer's Pocket-book, —BY— HENRY O'CONNOR
Comprising Tables, Notes and Memoranda relating to the Manufacture, Distribution and Use of Coal Gas, and the Construction of Gas Works. PRICE, $3.50. For Sale by
A. M. Callender & Co., 42 Pine St., New York City.

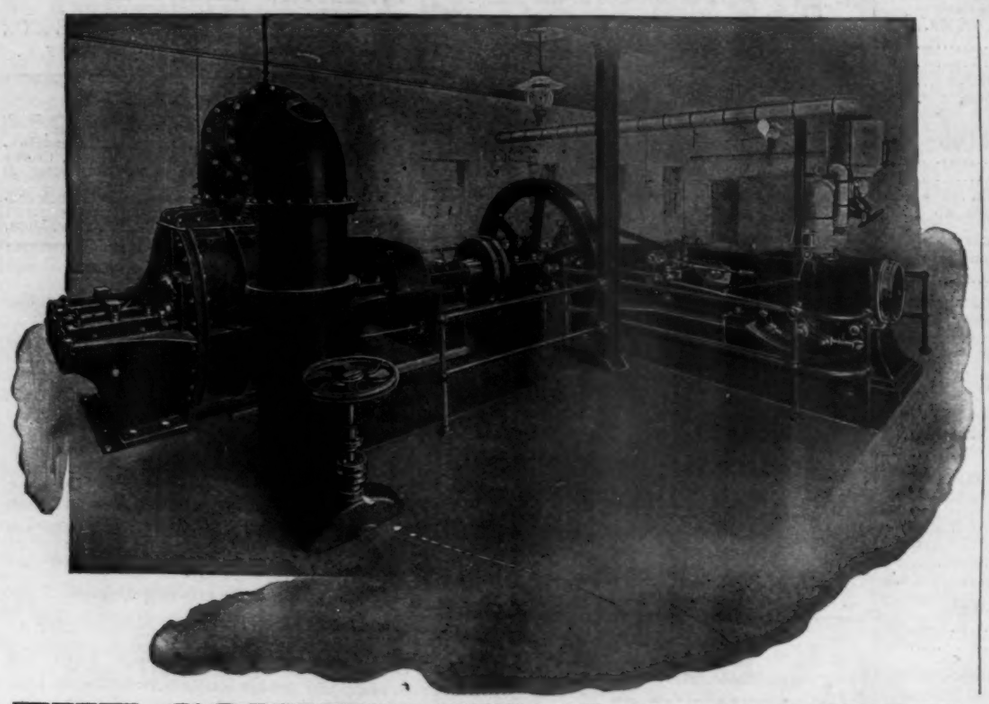


ECONOMY is secured in using "BROWNHOIST" LOCOMOTIVE CRANES equipped with "BROWNHOIST" GRAB BUCKET about Gas Plants. Write us for our circulars and learn more about this equipment.

MAIN OFFICE AND WORKS:
Cleveland, O.

BRANCH OFFICES:
New York and Pittsburg, Pa.

CONNERSVILLE GAS EXHAUSTERS
AND HIGH PRESSURE GAS PUMPS.



THIS cut shows one of our High Pressure machines and a 4-valve engine connected by one of our leather link flexible couplings. Two of these units were installed for the Peoples Gas Light and Coke Co., Chicago, at their 73d St. Station. Each machine has a capacity of 14,000,000 cubic feet per day.

We also manufacture

**GAS VALVES,
BY-PASS VALVES,
PRESSURE REGULATORS,
ETC., ETC.**

Correspondence Solicited.

THE CONNERSVILLE BLOWER COMPANY,
Connersville, Indiana, U. S. A.
NEW YORK OFFICE, 95 Liberty Street. - HORACE C. COOKE, Selling Agent.

OFFICERS:

E. C. BROWN, President. B. H. SPANGENBERG, Gen'l Mgr. and Eng'r.

L. J. MONTGOMERY, Sec'y and Treas. SIDNEY A. REEVE, M.E., Consulting Eng'r.

DIRECTORS:

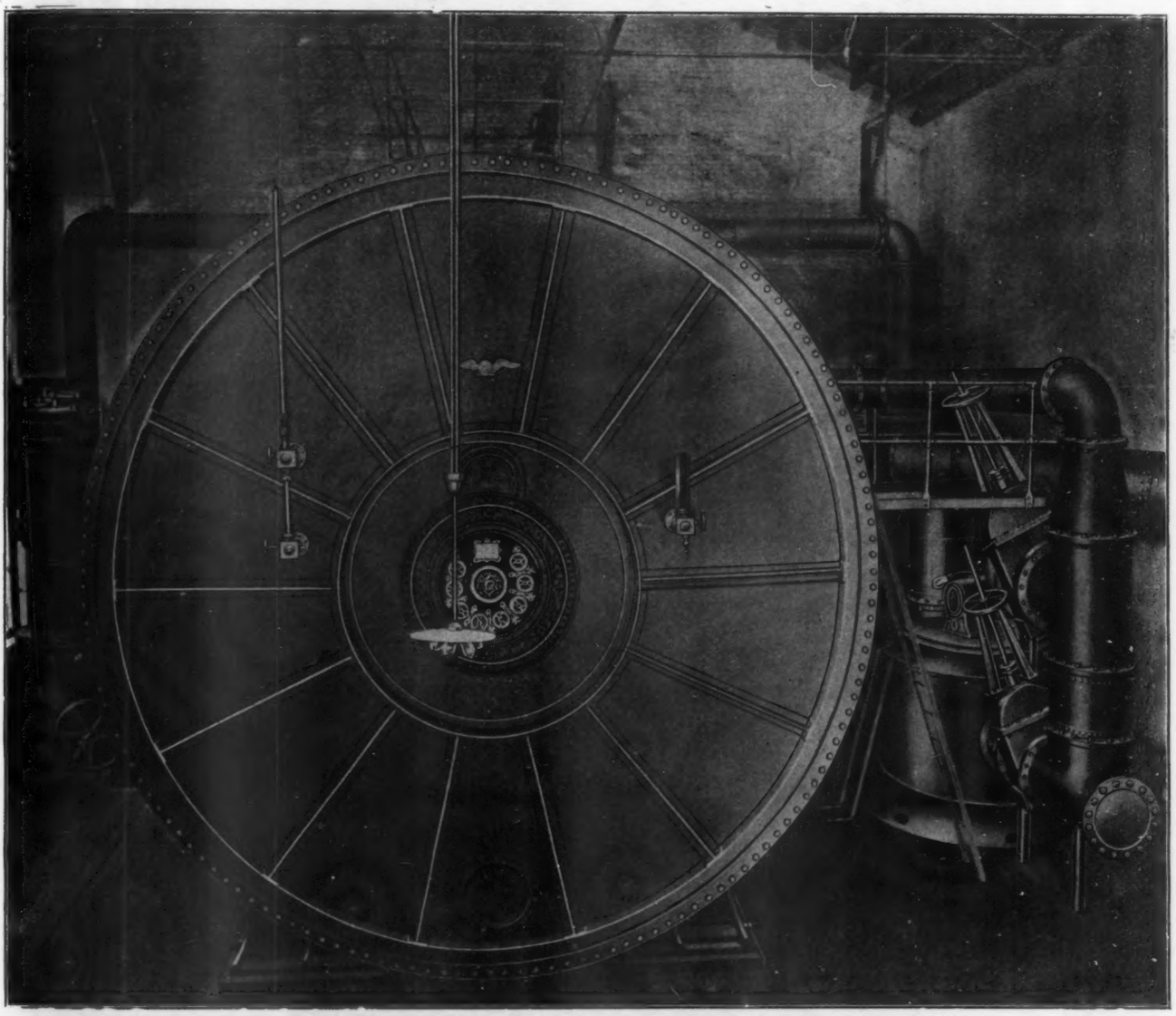
E. C. BROWN,
IRA C. COPLEY,
HENRY L. DOHERTY,
THOMAS G. MARSH, M.E.,
GEO. D. ROPER,
Dr. F. SCHNIEWIND,
FREDERICK H. SHELTON.

CANADIAN AGENTS:

The Economical Gas Apparatus Construction Co., Ltd., Toronto, Can.

EUROPEAN CONNECTIONS:

The Rotary Meter Co. (1905) Ltd., Manchester, England.
Compagnie pour la Fabrication des Compteurs et Materiel d'Usines a Gaz, Paris, France.



Interior View of part of Meter Room—Twenty-first Street Works,
CONSOLIDATED GAS COMPANY, NEW YORK.
Old Style Wet Meter, 6,000,000 cu. ft. capacity per day.

ROTARY STATION METER,

4,000,000 cu. ft. capacity per day (at right of picture).

One-half the cost—One-tenth the space of old style wet meters.

When in need of Station Meters, write

ROTARY METER COMPANY,
280 Broadway,
NEW YORK.

Send for Catalog.

P. PLANTING, President W. E. STEINWEDELL, Secretary

THE GAS MACHINERY CO.,

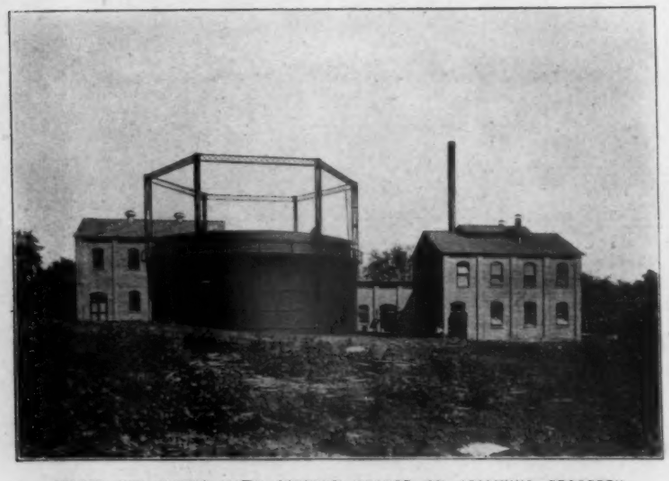
Main Office and Shops

CLEVELAND, OHIO.

NEW YORK OFFICE, - - 56 PINE STREET.

COAL AND WATER GAS APPARATUS.
EXHAUSTERS, CONDENSERS, SCRUBBERS,
TAR EXTRACTORS, WASHERS, PURIFIERS,
VALVES, CONNECTIONS.
BY PRODUCT MACHINERY.
COMPLETE GAS PLANTS.

PACIFIC COAST AGENTS: Hallidie Machinery Co., Seattle, Wash.



WATER GAS WORKS WITH STORAGE HOLDER ON ADJOINING PROPERTY.

THE GAS MACHINERY CO.
CLEVELAND, OHIO.

ANNOUNCEMENT.

January 1st, 1908.

TO OUR PATRONS AND FRIENDS:

Our new Firebrick Factory has been completed and we are now ready to take orders for high grade fireclay products of any description and magnitude. We design and build

Coal Gas Benches,

VERTICAL, INCLINED OR HORIZONTAL RETORTS,

LATEST PATENTED SYSTEMS.

Coke Ovens,

BEEHIVE AND BY-PRODUCT CONSTRUCTION,

Manufacture Linings for Water Gas Apparatus, Rotary Cement Kilns, Blast Furnaces and Stoves, Steel Furnaces, Lime Kilns, Cupolas, etc., etc.

SPECIAL GLASS HOUSE REFRACTORIES.

WE IMPORT THE FINEST FIRECLAY FOR SPECIAL HIGH GRADE WORK.

Our Chemist Engineers are familiar with analyzing clays and producing mixtures so that the finished products will answer specific purposes with regard to refractory as well as physical properties.

ALL MATERIAL OF THE VERY BEST QUALITY AND WILL BE SOLD AT THE LOWEST PRICES PERMISSIBLE.

Your Correspondence is Respectfully Solicited.

DIDIER-MARCH COMPANY.

FREDERICK J. MAYER, General Manager.

Factories: Keasbey, N. J. *Offices: Keyser Bldg., Baltimore, Md.* *Park Row Bldg., New York.*

FREDERICK J. MAYER, M.E.,

Main Office: Keyser Bldg., Baltimore, Md. *Branch Office: Park Row Bldg., New York.*

Bench construction of most modern type, with horizontal, inclined and vertical retorts, together with retort houses, coal and coke handling machinery, specially designed to suit the characteristic requirements of the benches.

CONSULTING AND CONSTRUCTING ENGINEER.

Plans for modern and up-to-date coal and water gas plants. Modernizing existing plants to cheapen costs of production. Valuation of plants, etc., etc.

Sole representative of the Dessau Vertical Retort Bench Co.,

Berlin, Germany.

YORK

Low Priced Cookers and Single Oven Ranges

Are Coming into Greater Favor,

And the new line of 3 and 4-burner Cookers, steel construction, with or without broiler, will interest any gas man that wants a fine looking article, well made, and at a low price. Cuts will be shown in a later issue.

YORK SINGLE OVEN RANGE,

$16.00 List,

With the Open Door Lighter.

—MADE BY—

ABENDROTH BROS.,

PORT CHESTER, N. Y.

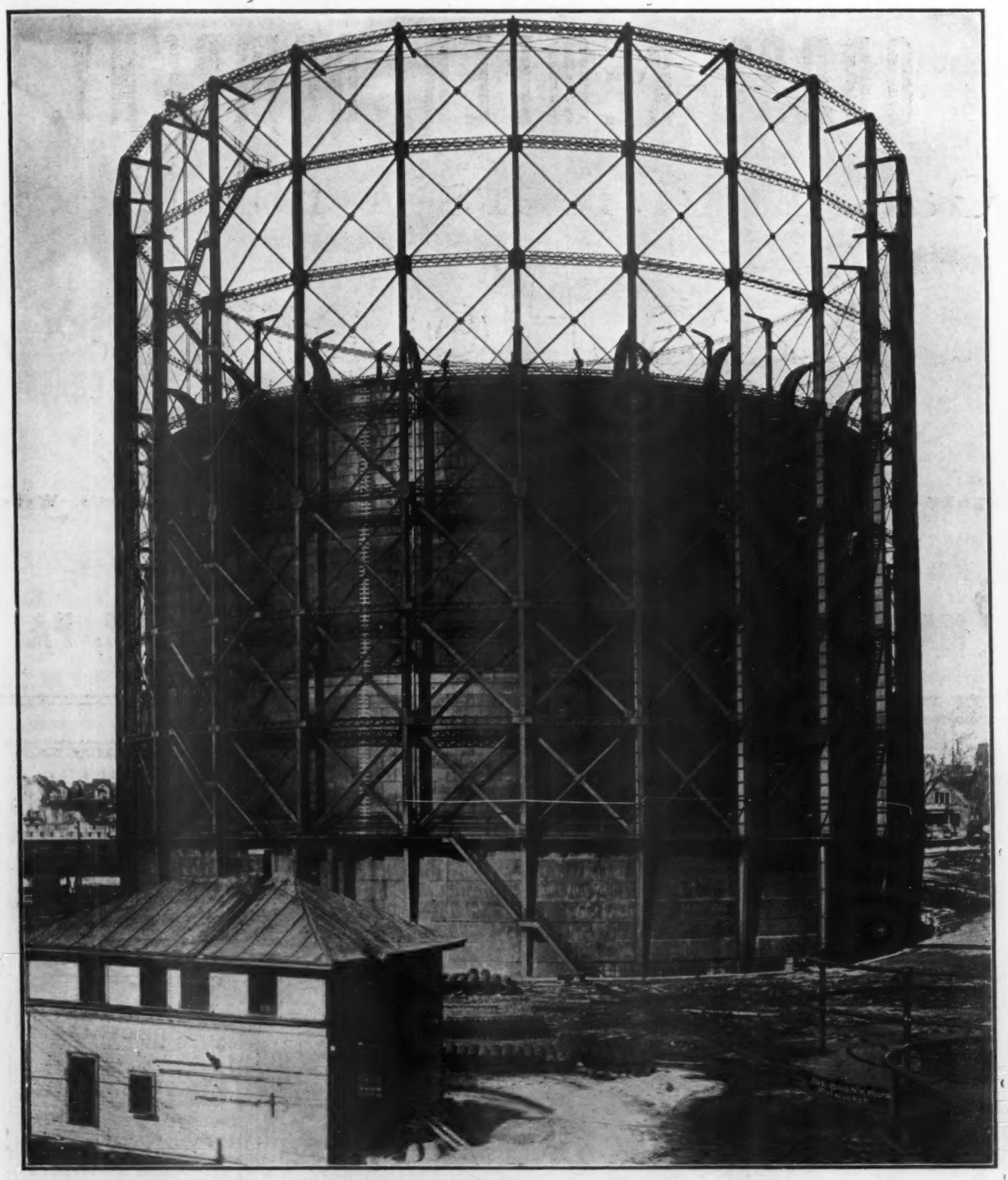
WE CAN MAKE QUICK DELIVERY OF YOUR ORDERS FOR

Atlantic Tubing Company's Gas Tubing.
Humphrey's Crescent Bath Water Heaters.
Staple Gas Brackets—Rope, Square, Vine, Etc.
Special Turned Brackets—*the finest line made.*
Bargamin's Automatic Soldering Furnaces.
Climax Copper Coil Water Heater.
With the Largest Capacity at the Lowest Price.
Union Gas and Electric Fixture Company's Fixtures.

FRED. K. WELLS COMPANY,

18 Warren Street, New York City,

SELLING AGENTS FOR ALL GAS APPLIANCES.



The Largest Steel Tank Gasholder in the World, 225 Feet 9 Inches Diameter, 35 Feet Deep, Five Lifts.

RITER-CONLEY MFG. CO.,

PITTSBURGH.

PLATE AND STRUCTURAL WORK OF EVERY DESCRIPTION.

COMPLETE COAL GAS PLANTS.

CRUSE-KEMPER COMPANY,

Gas Engineers and Builders.

GAS HOLDERS.

Western Sales Agent:
HENRY I. LEA, 616 The Rookery, Chicago, Ills.

Pacific Coast Agents:
HALLIDIE MACHINERY CO., Seattle, Wash.

MAIN OFFICE AND WORKS, - - - - AMBLER, PA.

J. S. DeHART, JR., PRESIDENT
A. F. WEHNER, SECRETARY
R. K. WEHNER, TREASURER

ISBELL-PORTER COMPANY

GAS ENGINEERS & BUILDERS OF GAS WORKS

BENCH WORK

CHARGING AND DISCHARGING MACHINERY

MACKENZIE EXHAUSTERS

PRIMARY AND SECONDARY CONDENSERS FOR FRESH OR SALT WATER

ISBELL VALVES SPECIALS

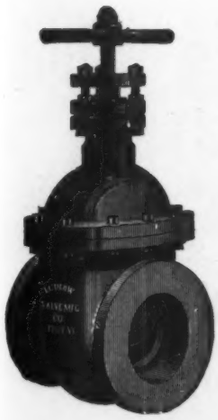
TAR EXTRACTORS

P. & A. TAR EXTRACTORS FOR WATER GAS

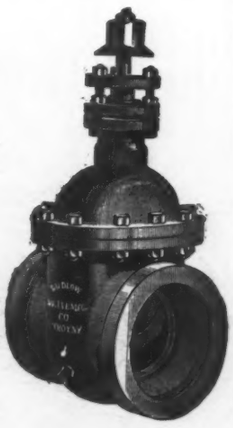
ROTARY AMMONIA SCRUBBERS

SHAVING SCRUBBERS PURIFIERS STREET GOVERNORS

MAIN OFFICE AND WORKS
BRIDGE & OGDEN STREETS
NEWARK, N.J.
ESTABLISHED 1865



THE
Ludlow Valve Mfg. Co.,
TROY, N. Y., U. S. A.
Double and Single Gate Valves, ¼" to 72",
—FOR—
Gas, Water, Steam, Oil, Ammonia, Etc.
HOT GAS VALVES A SPECIALTY.
Send for Catalogue.



THE BRISTOL CO.,
MANUFACTURERS OF
BRISTOL'S
REG. U. S. PAT. OFFICE.
RECORDING INSTRUMENTS
for
PRESSURE, TEMPERATURE AND ELECTRICITY,
INCLUDING
THE WM. H. BRISTOL
Electric Pyrometers
AND
Patent Smoked Chart Recorders.

Special Indicating and Recording Pyrometer Outfits for
WATER GAS MACHINES.
THE BRISTOL CO.,
WATERBURY, CONN.
114 Liberty St., New York. 45 Vesey St., New York. Monadnock Bldg., Chicago.

QUINTARD IRON WORKS,
N. F. PALMER,
Foot of 12th St. & East River, New York,
MANUFACTURERS OF
GAS APPARATUS.
Complete Works Erected.
FREDERICK W. FLOYD, Engineer

ESTABLISHED 1856.
HENRY MAURER & SON,
Manufacturers of
High Grade Firebrick, Blocks, Tiles,
ETC.,
Works: Maurer, N. J. Office: 420 E. 23d St., N. Y. City.

POOLE ON FUELS.
THE CALORIFIC POWER OF FUELS.
By HERMAN POOLE, F.C.S.
Second Edition. Price, $3. For Sale by
A. M. CALLENDER & CO., 42 PINE ST., N.Y. CITY

ELECTRIC GAS LIGHTING.
How to install electric gas igniting apparatus, including the jump spark and multiple systems for use in houses, churches, theaters, halls, schools, stores or any large building. Also, the care and selection of suitable batteries, wiring and repairs.
By H. S. NORRIE.
Price, 50 cents. Orders may be sent to
A. M. CALLENDER & CO., 42 PINE ST., N. Y. CITY.

ASK US
WHAT YOU WANT TO KNOW ABOUT
GAS BENCHES
"LACLEDE-CHRISTY"
LACLEDE-CHRISTY CLAY PRODUCTS CO.
ST. LOUIS, MO.
"ANYTHING IN CLAY PRODUCTS."

LLOYD CONSTRUCTION COMPANY

THE LLOYD INTENSIVE SCRUBBER.

DETROIT—MICHIGAN

"The Stationary Rotary."

No Inefficient Surface Thru Supersaturation.

Mueller Gas Tapping Machines.

The main spring of a watch is only a small portion of the whole, but it is mighty important at that---it operates the watch.

The ratchet wheel, dog and handle of a Mueller Gas Tapping Machine, like the watch's spring, are a small part of the whole, but very important---they operate the machine.

They have wearing qualities and power to insure satisfactory work. The wheel and the dog are finely tempered tool steel---they'll wear for years---while the handle is malleable iron and long enough to exert power to make the machine easy to operate.

Unconditionally Guaranteed.

TRADE MARK MUELLER REGISTERED

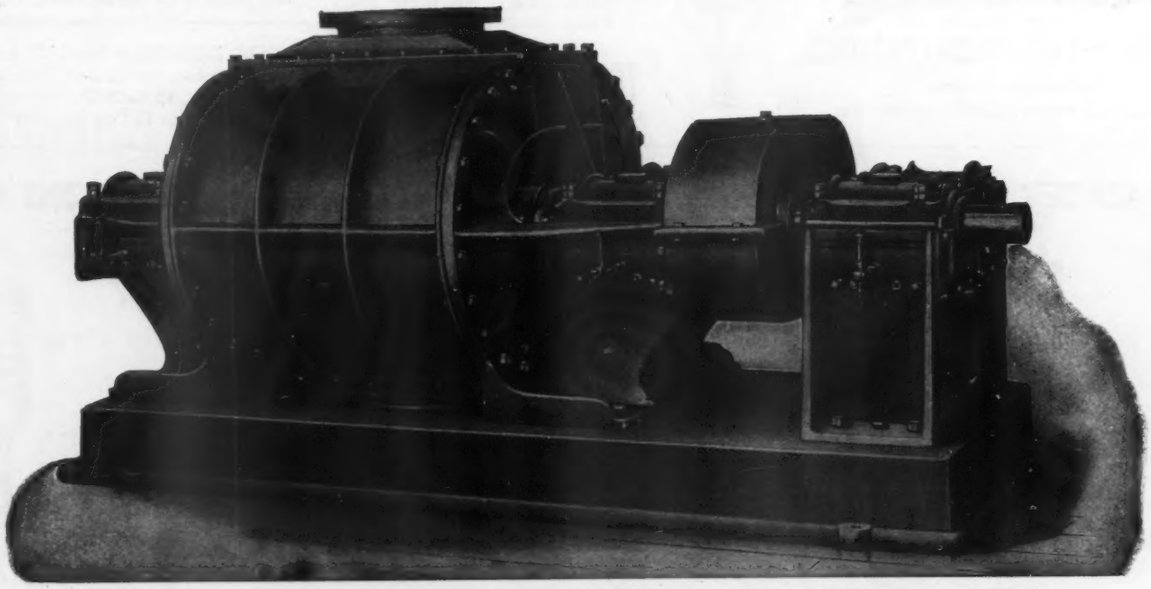
H. MUELLER MFG. CO.,

Works and General Offices,
DECATUR, ILL., U. S. A.
West Cerro Gordo St.

Eastern Division,
NEW YORK, N. Y., U. S. A.
254-258 Canal St. (cor. Lafayette).

ROOTS' EXHAUSTERS for HIGH and LOW PRESSURE WORK.

The highest efficiencies obtained. Most perfect devices for adjustment and maintenance of proper alignment. Use our flexible coupling to correct troubles caused by misalignment and engine shaft thrust. Our gas governor is the best. By-pass, gas valves and fittings.



P. H. & F. M. ROOTS COMPANY,

HOME OFFICE: Connersville, Ind. NEW YORK OFFICE: 120-122 Liberty St. CHICAGO OFFICE: 1547 Marquette Bldg.

Send for pocket edition of Engineers' practical reference book.

-in every store where there's something doing
You find
HUMPHREY GAS ARC LAMPS
Because every fabric, every color scheme, every article gets it's true color value
THE MERCHANT ALSO IS GETTING THE CHEAPEST STORE ILLUMINATION TO BE HAD AND THE BEST AS WELL

GEORGE ORMROD, Pres. & Treas. JOHN D. ORMROD, Supt.
J. G. EBERLEIN, Secretary.

EMAUS PIPE FOUNDRY.

DONALDSON IRON COMPANY. EMAUS, PA.

MANUFACTURERS OF

CAST IRON PIPE AND SPECIAL CASTINGS

FOR WATER AND GAS.

Also, FLANGE PIPE, LAMP POSTS, Etc.

"THE MINER"

Globe Street and Boulevard Lamps.

Cheapest and Best

THOUSANDS IN USE WITH INCANDESCENT BURNERS.

Send for Catalogues.

THOMAS T. W. MINER,

821-823 Eagle Av., N.Y.

Practical Photometry,

By William Joseph Dibdin.

Price, ... $3.00.

FOR SALE BY

A. M. CALLENDER & CO.,

42 Pine St., New York City.

STANDARD REDUCTION FACTORS for GASES,
By Helon Brooks MacFarland, B.S., M.M.E.
Price, $1.50. *For Sale by*
A. M. Callender & Co., 42 Pine St., New York City.

FOR EXTERIOR LIGHTING

— USE —

Bray's Special Burner.

BRAY'S MARKET OR STANDARD BURNERS.

For Markets, Meat Shops, Fruit Stands, Show Windows, Street Lamps, and all places where high candle power is required.

These Burners Give a Large, Well-Shaped Flame.

They are Very Durable and Can be Depended Upon to Give Satisfactory Service for Years.

Market burners can be furnished in Nos. 8 and 9. The Jumbo burner is 30-candle power size.

Prices on Application.

W. M. CRANE COMPANY, NEW YORK, Sole Agents U. S. and Canada.

Bray's Standard Jumbo.

PARKER-RUSSELL MINING AND MFG. CO.,

ST. LOUIS, MO.

ST. LOUIS OFFICE: Suite 501-508 Liggett Building, 8th and Chestnut Streets.
NEW YORK OFFICE: 45 Broadway.

GAS RETORT BENCHES, STOKING MACHINERY, STAND-PIPE CLEANER AND STRAIGHT STAND-PIPE SYSTEM.

GAS RETORTS AND FIREBRICK.

We Manufacture Gas Retorts and Settings, Furnace Blocks and Fire Clay Tiles of Every Description.

Benches.--We erect GAS RETORT BENCHES with Horizontal retorts having closed ends up to 10 feet in length, or Through retorts up to 20 feet in length.

Slopers.--Also, SLOPERS on improved lines for Inclined Retorts.

Stoking Machinery.--Sole Agents for U. S. and Canada for the Fiddes-Aldridge Simultaneous Discharging Charger. The "F. A.," or "One-Stroke" Machine. Cost of Carbonizing reduced to minimum. No Dust. Silent. No Waste of Coal. No Injury to Retorts.

Water Gas Linings.--We make a specialty of WATER GAS BLOCKS, and supply brick of superior grade for checkerwork.

Stand-Pipe Cleaner and Straight Stand-Pipe System.--Agents for the sale of the Stand-Pipe Cleaner and Straight Stand-Pipe System of the United Gas Improvement Company.

Retort Houses and Conveying Machinery.--We also build Retort Houses, Coal and Coke Conveying Machinery. Plans, specifications and estimates cheerfully furnished.

CORRESPONDENCE SOLICITED.

ALL CONTRACTS MADE, AS OF ST. LOUIS.

Directory of American Gas Companies, 1907. **Price, $5.00.**
For Sale by
A. M. Callender & Co., 42 Pine St. N. Y.

AMERICAN METER CO.,

NEW YORK, ST. LOUIS, PHILADELPHIA, SAN FRANCISCO, CHICAGO,

Photometrical and Experimental Apparatus.

PUBLIC LIGHTING TABLE.

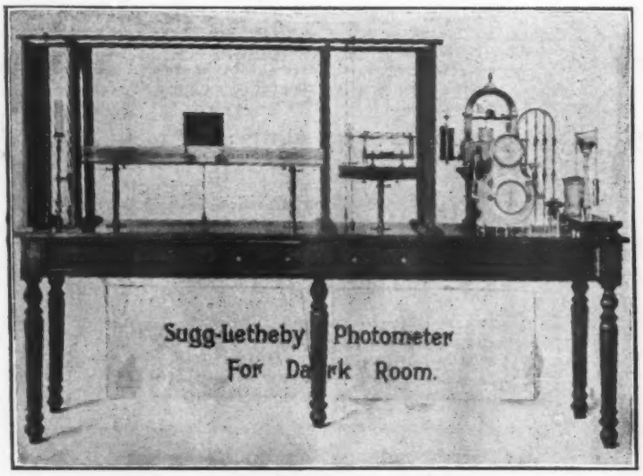
MAY, 1908.

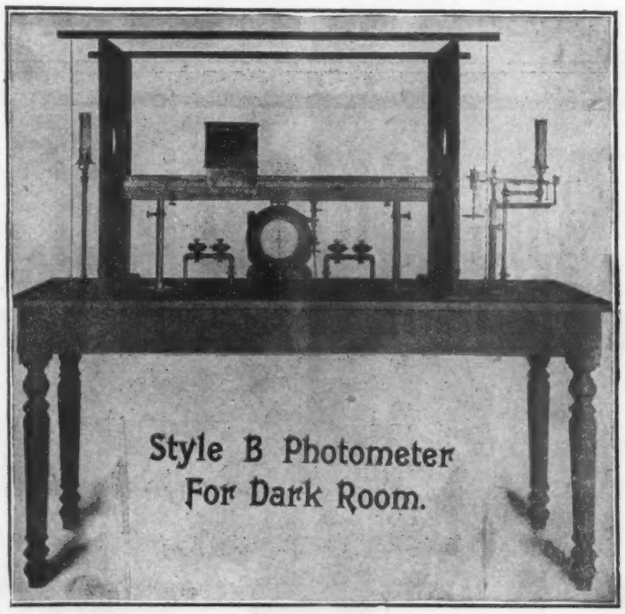
Day of Week.	Date.	Table No. 1. Following the Moon. Light.	Extinguish.
Fri.	1	7.20 PM	4.00 AM
Sat.	2	7.20	4.00
Sun.	3	7.30	3.50
Mon.	4	7.30	3.50
Tue.	5	11.00	3.50
Wed.	6	11.40	3.50
Thu.	7	12 20 AM PM	3.50
Fri.	8	12.50	3.50
Sat.	9	1.20	3.50
Sun.	10	1.50	3.50
Mon.	11	2.10	3.50
Tue.	12	2.40	3.50
Wed.	13	3.10	3.50
Thu.	14	No L.	No L.
Fri.	15	No L. PM	No L.
Sat.	16	No L.	No L.
Sun.	17	7.40 PM	10.00 PM
Mon.	18	7.40	11.10
Tue.	19	7.40	12.10 AM
Wed.	20	7.40	1.00
Thu.	21	7.40	1.40
Fri.	22	7.40 LQ	2.20
Sat.	23	7.40	2.50
Sun.	24	7.50	3.20
Mon.	25	7.50	3.40
Tue.	26	7.50	3.40
Wed.	27	7.50	3.40
Thu.	28	7.50	3.40
Fri.	29	7.50 NM	3.40
Sat.	30	7.50	3.40
Sun.	31	7.50	3 30

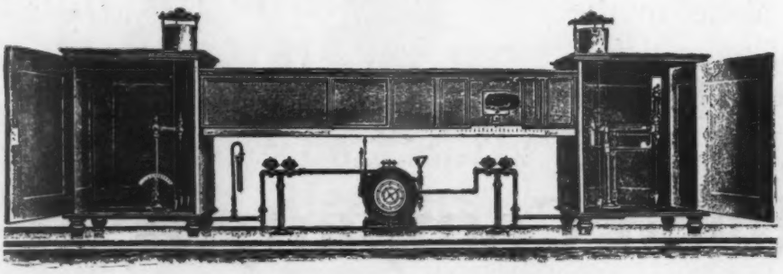
TOTAL HOURS DURING 1908.

By Table No. 1.

	Hrs.Min.
January	228.30
February	187.30
March	192.00
April	160.10
May	155.10
June	138.00
July	155.50
August	173.40
September	185.20
October	214.00
November	218.10
December	226.40
Total, yr.	2235.00







Closed Photometer For Light Room.

CIRCULARS SENT ON REQUEST.

PUBLIC LIGHTING TABLE.

MAY, 1908.

Day of Week.	Date.	Table No. 2. New York City. All Night Lighting. Complete Lighting in One Hour	Complete Extinguishing in 50 Minutes
		From Time Given	
		P. M.	A.M.
Fri.	1	6.47	3.52
Sat.	2	6.47	3.52
Sun.	3	6.47	3.52
Mon.	4	6.47	3.52
Tue.	5	6.47	3.52
Wed.	6	6.47	3.52
Thu.	7	6.57	3.42
Fri.	8	6.57	3.42
Sat.	9	6.57	3.42
Sun.	10	6 57	3.42
Mon.	11	6.57	3.37
Tue.	12	6.57	3.37
Wed.	13	6.57	3 37
Thu.	14	7.07	3.27
Fri.	15	7.07	3 27
Sat.	16	7.07	3.27
Sun.	17	7.07	3.27
Mon.	18	7.07	3.27
Tue.	19	7.07	3.27
Wed.	20	7.07	3 27
Thu.	21	7.12	3.22
Fri.	22	7.12	3.22
Sat.	23	7.12	3.22
Sun.	24	7.12	3.22
Mon.	25	7.12	3.22
Tue.	26	7.12	3 22
Wed.	27	7.12	3.22
Thu.	28	7.12	3.17
Fri.	29	7.12	3.17
Sat.	30	7.12	3 17
Sun.	31	7.12	3.17

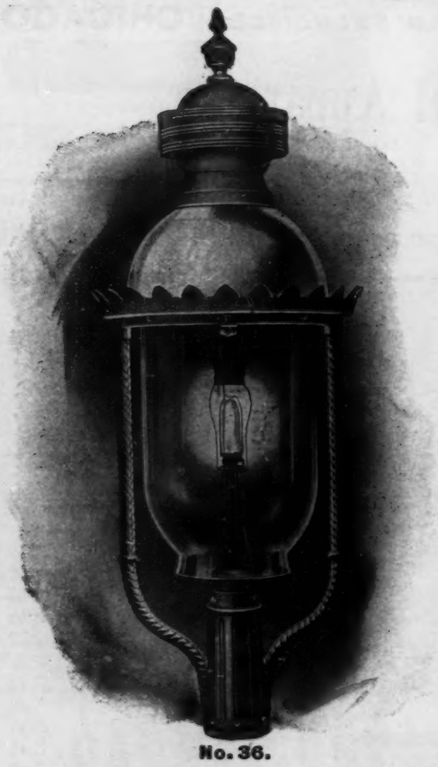
TOTAL HOURS DURING 1908.

	Hrs.Min.
January	481.50
February	329.15
March	351.50
April	341.50
May	233.05
June	218.10
July	282.55
August	254.55
September	292.25
October	420.45
November	374.30
December	411.05
	3992.35
Deduct on account of 50 min. extinguishing time	30.30
Total, yr.	3962.05

NEW YORK, 318 West 42d Street.
BOSTON, 820 Beacon Building.
PHILADELPHIA, Broad and Arch Streets.
ST. LOUIS, 712 Roe Building.
CHICAGO, 218 La Salle Street.
SAN FRANCISCO, 512 Oak Street.

WELSBACH STREET LIGHTING COMPANY

....OF AMERICA....



No. 36.

Controls and Operates the **Welsbach System of Street Lighting,**

Which includes its specially DESIGNED and PATENTED BURNER for PARK LIGHTING exclusively.

Uniformly SUCCESSFUL in 150 Cities and Towns.

By means of the Welsbach System of street lighting the superiority of GAS over electricity for street lighting has been fully demonstrated.

POINTS OF MERIT:

It is { Economical, Attractive, Successful, Up-to-date.

IT LIGHTS THE STREET.

Where there are no gas mains we can furnish an equally good light by our SELF-GENERATING NAPHTHA WELSBACH BURNER, and thereby supply a uniform light in all localities.

Correspondence Solicited from Gas Companies and Others interested in Municipal and Outside Lighting.

No. 38.

The Chic Light.

ONE OF THE MOST POPULAR AND BEST SELLERS OF THE WELSBACH LINE.

For decorative appearance and large volume of light at a popular price to the consumer,

THE CHIC LIGHT

is practically alone in the field. Complete satisfaction to the user is its strong point.

THE CHIC LIGHT—Design No. 71310.

PRICES:

Boxed complete, with No. 71 Welsbach burner, No 310 F. Q. M. cylinder, No. 196 Junior J Brand Welsbach mantle, including the No. 316 opal shade, which will be packed separately.

Price, complete, clear cylinder, each, dozen lots, ... $1.35
Price, complete, clear cylinder, 100 lots, each, ... 1.25

When supplied with **No. 310 F. Q. M. Opal Cylinder** add 10 cents to above list.

Price of Shade No. 316.
Package Contains 16 Dozen.

Price, per dozen, ... $4.40
Price, original package, per dozen, . 4.00

WRITE FOR DISCOUNTS.

Welsbach Company, FACTORIES: Gloucester, N. J. Chicago, Ills.

Salesrooms in all Leading Cities of the United States.

The United Gas Improvement Company,

Broad and Arch Streets, Philadelphia.

LESSEES, OPERATORS AND BUILDERS OF **GAS WORKS.**

Largest Builders of CARBURETTED WATER GAS PLANT IN AMERICA.

SOLE AMERICAN BUILDERS

OF THE

Standard Double-Superheater Lowe Water Gas Apparatus.

1907 CONTRACTS.

PARTIAL LIST OF PLACES:

Newburgh, N. Y.
Helena, Mont.
Bridgeport, Conn. (3d contract).
Suffolk, Va.
Winsted, Conn. (2d contract).
Nashua, N. H.
Augusta, Me. (2d contract).
Everett, Mass.
Jenkintown, Pa. (2d contract).
Coney Island, N. Y.
Mexico, Mo.
Jacksonville, Fla.
Syracuse, N. Y. (2d contract).
Atlanta, Ga. (2d contract).
Holyoke, Mass.
Peoria, Ills.
Schenectady, N. Y. (2d contract).
Danbury, Conn.
Galveston, Tex. (2d contract).
Quebec, Canada.
Indianapolis, Ind. (2d contract).
Bessemer, Ala.
Waterbury, Conn. (5th contract).
Sioux Falls, S. D. (3d contract).
Philadelphia, Pa.
New Hartford, Conn.
Poughkeepsie, N.Y. (2d contract)
Nashville, Tenn.
Salisbury, Md.
Norfolk, Va. (4th contract).
Wallingford, Conn.
Richmond, Va. (2d contract).
Oak Bluffs, Mass.
Arlington, Mass.

TOTAL SETS INSTALLED DURING YEAR, ... 43
TOTAL SETS INSTALLED TO DECEMBER 31, 1907, ... 677
TOTAL DAILY CAPACITY, TO DECEMBER 31, 1907, ... 545,865,000 cu. ft.

Tar Extractors for Carburetted Water Gas.
Photometrical Apparatus.
Gas Analysis Apparatus.
Recording Gauges.
Straight Standpipe System for Coal Gas Retorts
Straight Standpipe Cleaners.
Waste Heat Boiler.
Hygrometer.
Venturi Meter for Measuring Flow of Air Blast.

Established 1858. Incorporated 1890.
CHAS. E. GREGORY, Prest. DAVID R. DALY, V.-Prest. & Treas.
H. D. ABERNETHY, Sec.

J. H. Gautier & Co.

Greene & Essex Streets,
Jersey City, N. J.

MANUFACTURERS OF

CLAY GAS RETORTS, FIRE CLAY TILES, FIRE BRICK and FIRE CLAY SPECIALTIES.

Ground Fire Clay, Fire Sand and Ground Fire Brick in Barrels and Bulk.

SOLE MANUFACTURERS OF THE

FLEMMING GENERATOR GAS FURNACE

The Gas Engineer's Pocket-Book,

By HENRY O'CONNOR.

Comprising Tables, Notes and Memoranda relating to the Manufacture, Distribution and Use of Coal Gas, and the Construction of Gas Works.

PRICE, $3.50.

For Sale by

A. M. CALLENDER & CO., 42 Pine Street, New York City.

ESTABLISHED 1868.
L. N. RANCKE, Vice-Pres. & Mgr. F. SCHIAFFINO, Sec'y & Treas.

BALTIMORE RETORT & FIREBRICK CO.

BALTIMORE, MD.,

Manufacturers of all Material for the Construction of Coal Gas Benches.

HALF AND FULL DEPTH AND FREE FIRING BENCHES,

All styles of which we have in operation, equipped with the BEST of LATEST IMPROVEMENTS, proving our claim for SUPERIOR QUALITY and EFFICIENCY.

INCLINES—We have in SUCCESSFUL OPERATION benches of Inclined Retorts, MANUFACTURED and ERECTED by us.

WALDO BROS., 102 MILK ST., BOSTON, MASS.,
Agents for New England States.

LARGE FACILITIES—Correspondence Solicited.
RAIL and WATER CONNECTIONS to ALL POINTS.

L. C. HAMLINK, PRES. AUGUST COURT, SEC'Y.

GAS BENCH CONSTRUCTION COMPANY,

METROPOLITAN BUILDING, ST. LOUIS, MO.,

Engineers and Builders of all styles of Standard and Special Benches from one to twelve Retorts, Horizontal, Vertical, or Inclined.

We will guarantee "Better Benches," to be easier to control, make more gas per retort, and operate with less fuel than any bench on the market.

ALL WORKMANSHIP AND MATERIAL GUARANTEED.

JOHN DELL,
President and General Manager.

MISSOURI FIRE BRICK CO.,

ESTABLISHED 1882.

MANUFACTURERS OF

Gas Retorts, Bench Settings, Fire Brick, Cupola Linings, Etc.

We are the **Exclusive Agents** *for the* **Mitchell Patent Benches,** *Constructed with Half or Full Depth Furnaces, to Burn either Coal or Coke, and Arranged for Front or Rear* **Clinkering.** **The Mitchell** *is the* **Original Coal Firing Bench.** *We also Erect Plain Benches with* **One** *to* **Six Retorts.**

YOUR CORRESPONDENCE IS RESPECTFULLY SOLICITED.

City Office: *411 Olive Street, Continental Bank,* ST. LOUIS, MO.

Newbigging's Handbook for Gas Engineers and Managers. Price, $6.50. For Sale by A. M. Callender & Co., 42 Pine St., N. Y. City

Bronder Patent Stoking Machinery.

Three-Scoop and Three-Rake Charging and Discharging Machines are operating in New York, Newark, N. J., Philadelphia, Worcester, Mass., Mt. Vernon, N. Y., Toronto and Montreal, Canada, Detroit, Seattle, Rochester and St. Louis.

Four-Scoop and Four-Rake Charging and Discharging Machines are operating in Detroit, Mich., and Cincinnati, Ohio. These are the only machines that will draw or charge simultaneously 3 or 4 retorts (vertically) and handle from 42 to 60 retorts in from 25 to 30 minutes, lid opening and closing and filling of furnaces included.

Hot Coke Conveyor, Quencher and Steam Exhauster, operating in Toronto, Canada, working in water-sealed flue, rollers being protected from heat and grit.

COAL CRUSHERS, CONVEYORS AND BINS. TURNTABLES FOR MACHINES.

Labor-Saving Machines for Handling Coal and Coke from Coal Cars to Coke Yard or Bins. Coke Screening and Measuring Plants a Specialty.

G. A. BRONDER,
Contracting Engineer and Builder,
229 BROADWAY, NEW YORK.

CONNELLY IRON SPONGE AND GOVERNOR CO.,

Automatic, Balance, High Pressure and Service Governors,

Unison Telemetric Pressure Gauge,

Iron Sponge, Purifying Material for Gas Purification, Jones Jet Photometers, Pressure Registers, etc.,

The National Smoke and Ammonia Helmet.

Wide Experience in High Pressure Installation and Extension.

395 BROADWAY, NEW YORK CITY. 295 WEST 22D STREET, CHICAGO, ILLS.

12-Inch High Pressure Governor.

REYNOLDS' GAS REGULATOR COMPANY,

ANDERSON, IND., U. S. A.

We make all sizes for all classes of reduction,

Double and Single District Stations,

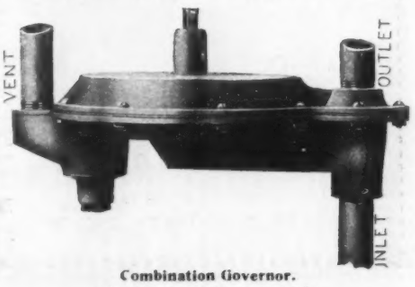
And Individual Service Governors for Reducing High Pressure.

HOLDER GOVERNORS

And Low Pressure Regulators, all of the Dry Diaphragm type.

English Agents:
THE BRYAN DONKIN CO., LTD., Chesterfield, England.

Write for Catalog.



Combination Governor.
(Governor and Mercury Seal.)

1907 DIRECTORY 1907

OF AMERICAN GAS COMPANIES.

Price, - - - - - - - - $5.00.

A. M. CALLENDER & CO., 42 Pine Street, New York City.

JAMES D. PERKINS, President. F. SEAVERNS, Treasurer.

THE PERKINS COMPANY,

228 and 229 Produce Exchange, New York City.

OCEAN MINE YOUGHIOGHENY GAS COAL,
OLD KENTUCKY SHALE AND O. K. BOGHEAD.

BERWIND-WHITE COAL MINING COMPANY'S

Ocean Westmoreland Gas Coal.

Offices:
Washington Building, New York.
Betz Building, Philadelphia.

STRICTLY High Grade. . . . .
Carefully Prepared.
For Gas Making or
Heavy Steaming. .

A. C. M. AZOY, General Agent, 1 Broadway, New York.

NAPHTHALENE SOLVENT.

Cheap and Efficient.

For Use in Works, Mains and Service Pipes. Shipped in 100-gallon Drums.

Semet-Solvay Co.,
(P. O. Box 1)
SYRACUSE, N. Y.

JEFFREY
COAL HANDLING MACHINERY,
Installed for Cleveland Worsted Mills.

At Driving Point.

Send for Bulletins B and C,
ELEVATING,
CONVEYING,
CRUSHING
Catalogs.

Under Boiler Room.

The main conveyer buckets are filled by a special automatic loader. The crusher and short conveyer are driven by an independent engine.

The JEFFREY MANUFACTURING CO.,
COLUMBUS, OHIO, U. S. A.
New York. Pittsburgh. Knoxville. Denver. Chicago. Boston. Charleston, W. Va. Montreal, Can.

ISAAC C. BAXTER, President.
Works.
LOCKPORT STATION, PA.

ESTABLISHED 1864.
JAMES GARDNER, JR., CO.,
Successor to WILLIAM GARDNER & SON.

PETER YOUNG, Secretary and Treasurer.
Address all communications to
JAMES GARDNER, JR., CO., Bolivar, Pa.

Fire Clay Goods for Gas Works.

GAS ANALYST'S MANUAL. By JAQUES ABADY. Price, $6.50. For Sale by A. M. Callender & Co., 42 Pine St., N. Y. City.

KELLER ADJUSTABLE COKE CRUSHER.

Strong, Simple, Durable. Will Crush any Size Desired.

C. M. KELLER,
Sec. & Supt. Gas Lt. & Coke Co.,
Columbus, Ind.
Correspondence Solicited.

PATRICK GOODMAN,

CONTRACTOR,

257-263 East 133d St.,

NEW YORK CITY.

'PHONE, 2583 MELROSE.

PIPE WORK A SPECIALTY.
WATER GAS, DRAINAGE.

THE ECONOMICAL GAS APPARATUS CONSTRUCTION COMPANY, LIMITED,

Consulting Engineers.

Builders of UP-TO-DATE Machinery and Appliances for Coal and Water Gas Plants. :: :: :: :: ::

PLANS,
SPECIFICATIONS
AND ESTIMATES
PREPARED.

AMERICAN OFFICE:
269 Front St., East, Toronto, Canada.

EDMUND H. McCULLOUGH, President. H. C. ADAMS, Vice-President. CHAS. F. GODSHALL, Treasurer. HENRY WHARTON, Secretary. C. B. NICHOLS, Assistant Secretary.

THE WESTMORELAND COAL CO.

Chartered 1854.

Mines situated on the Pennsylvania and the Baltimore and Ohio Railroads, in Westmoreland County, Pa.

POINTS OF SHIPMENT:

PHILADELPHIA, BALTIMORE, SOUTH AMBOY, N. J.,
WATKINS (SENECA LAKE), N. Y.

Since the commencement of operations by this Company its well-known Coal has been largely used by the Gas Companies of New England and the Middle States, and its character is established as having no superior in gas-giving qualities, and in freedom from sulphur and other impurities.

Principal Office, 224 South 3d St., Phila., Pa.

GAS MAINS—SERVICE PIPES.

Their installation for High or Low Pressure is the work in which we have specialized for years. Because of our Facilities and Experience, many Gas Companies prefer to contract with us for such work, rather than to execute it themselves. It proves to be as cheap in the end. We solicit inquiries. SULLIVAN BROS.,

Telephone Connection. 11 Main St., Flushing, N. Y.

JOHN CABOT, President. GEO. D. CABOT, Secretary.

1412-1428 Adams Street, Hoboken, N. J.

PURIFIER AND SCRUBBER TRAYS.

Church's Patent Trays,

Reversible; Strongest; Most Easily Repaired.

We also Supply the Cheapest and Strongest

Reversible Bolted Trays.

Special Trays for Iron Oxide in Either Style.

GAS TAPPING MACHINES

—FOR—

Drilling and Tapping Pipe under Pressure

WITHOUT ANY ESCAPE OF GAS.

They are Strong and Compact.

Size of Combination Drills and Taps ¾ to 4-inch.

Machines Sent to any Gas Company for Thirty Days' Trial.

Send for Circulars.

Geo. Light,
DAYTON, O.

AMERICAN GAS ENGINEERING PRACTICE,

A HANDBOOK FOR ALL ENGAGED IN THE INDUSTRY,

Comprising Many Details Not Heretofore Published,

By M. NISBET LATTA, C.E.,

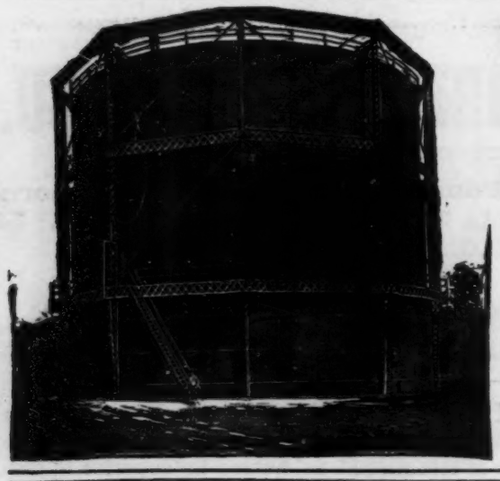
PART I. WATER GAS MANUFACTURE. The Generator. The Carburetter. The Superheater. Wash Box and Tar. Scrubbers. Condensers. Purifiers. Exhausters. Station Meters. Holders. Details of Works' Operation.

" II. GAS DISTRIBUTION. Naphthaline. Mains. Services. Consumers' Meters. Pressure. House Piping. Appliances.

" III. GENERAL TECHNICAL DATA. Properties of Gases. Steam. Mathematical Tables. Conversion Factors. Pipe and Miscellaneous Data.

Price, $4.50. For Sale by

A. M. CALLENDER & CO., 42 PINE ST., NEW YORK CITY.



DAVIS & FARNUM MFG. CO.,
Principal Office and Works, Waltham, Mass.

Single, Double and Triple-Lift Gasholders of any Capacity. Tubular, Pipe and Sinuous Friction Condensers of all Sizes.

Steel Tanks for Gasholders, Iron Roof Frames and Floors, Purifying Boxes, Center Seal or Valve Connections, Bench Work, Reversible Lime Trays.

Self-Sealing and Pressed Steel Mouthpiece Lids.

Coke Barrows, Coal Wagons, and all Apparatus Requisite for a Complete Gas Works.

Also, Gas and Water Pipe, Flanged Pipe, Sugar House Work, and Special Castings of all Descriptions.

H. M. BYLLESBY & COMPANY
(INCORPORATED).

GAS ENGINEERS,

DESIGN, CONSTRUCT AND OPERATE
COMPLETE COAL, WATER AND CRUDE OIL GAS PLANTS.

EXAMINATIONS AND REPORTS.

AMERICAN TRUST BUILDING
CHICAGO.

Oklahoma City, Okla. Mobile, Ala. San Diego, Cal.

ALEX. C. HUMPHREYS, M.E., M. Inst. C.E. ARTHUR G. GLASGOW, M.E., M. Inst. C.E.

HUMPHREYS & GLASGOW,
CONSULTING ENGINEERS.

BANK OF COMMERCE BLDG.,
31 Nassau Street,
New York.

38 VICTORIA STREET,
London, S. W.,
England.

ADVICE AS TO EXTENSION AND RECONSTRUCTION OF GAS AND ELECTRICITY PLANT.

COMPLETE EXAMINATIONS MADE.

PROPERTIES PURCHASED.

COAL HANDLING MACHINERY AT NEW BEDFORD GAS AND EDISON LIGHT CO.

Tub elevator and cable railway handling coal from vessels to storage bins. Gas coal is hoisted from a vessel with a tub elevator, and taken to the storage bins on a cable railway; length of the track from wharf to coal pockets, 867 feet.

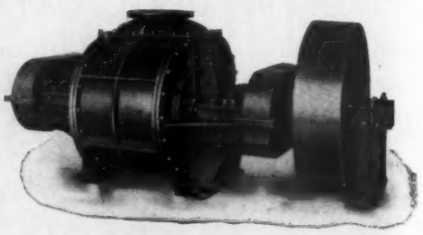
Other methods of handling coal and coke are by

HUNT NOISELESS CONVEYOR, AUTOMATIC RAILWAYS, and "INDUSTRIAL" RAILWAYS.

These are described in Bulletin B1.

Send for a Copy.

West New Brighton, N. Y. C. W. HUNT CO. 45 Broadway, New York City.



Gas Exhausters
AND
Blowers
(HIGH OR LOW PRESSURE).

If you want "The Best," and want to "Buy Right," address

THE
Piqua Blower Co.,
PIQUA, OHIO.

SELF-INSTRUCTION
For Students in Gas Manufacture.
ELEMENTARY, ADVANCED AND CONSTRUCTIONAL.

Three Volumes. Price, $1.50 each. For Sale by
A. M. Callender & Co.,
42 Pine Street, New York City.

Bartlett, Hayward & Company,

Baltimore, Md. 100 Broadway, New York.

GASHOLDERS,

Coal and Water Gas Plants.

KERR MURRAY MANUFACTURING COMPANY,

Engineers and Manufacturers

APPARATUS FOR COAL GAS PLANTS,

SINGLE AND DOUBLE-LIFT GASHOLDERS
AND STEEL TANKS,

Latest Improved

ROTARY EXHAUSTERS, P. & A. TAR EXTRACTORS, AMMONIA WASHERS,

CONDENSING, SCRUBBING AND PURIFYING APPARATUS.

Street Specials and Valves.

ADDRESS:

KERR MURRAY MANUFACTURING COMPANY, {FORT WAYNE, IND.

R. D. WOOD & CO.,

400 CHESTNUT ST., PHILADELPHIA,

MANUFACTURERS OF

Cast Iron Pipe.

HEAVY LOAM CASTINGS,

Dunham Specials,

Hydraulic Work,

LAMP POSTS, VALVES, ETC.,

Gas Power Plants with Producers.

BUILDERS OF

Gasholders.

Single or Multiple Lifts, with or without Metal Tanks.

PURIFIERS, CONDENSERS, SCRUBBERS, BENCH WORK.

Cutler's Patent Freezing Preventer for Holder Cups.

Double Gate Valves.

A LARGE STOCK ON HAND READY FOR PROMPT SHIPMENT.

These valves are provided with double discs or gates, and are tight with the gas pressure on either side of them.

The discs are so arranged as to be free from their seats when being opened or closed, and are operated by a quick-acting mechanism. The valve stem extends outside of the bonnet, and serves as an index, showing whether the valve is closed or open, and the amount of opening. They are made of the following dimensions:

Size.....	8 inches	10 inches	12 inches	16 inches	20 inches	24 inches	30 inches	36 inches
Diameter of flanges. .	13 inches	16 inches	18 inches	22½ inches	27 inches	31 inches	31½ inches	44 inches
Face to face of flange...	12 inches	12 inches	12 inches	14 inches	17 inches	20 inches	21 inches	23⅞ inches

For price and other information, apply to

THE CONTINENTAL IRON WORKS,

P. O. STATION G. NEW YORK (BOROUGH OF BROOKLYN).

FRANK D. MOSES,

Telephone, 1503-D Telephone, 1503-D

TRENTON, N. J.,

Constructing Engineer and Contractor.

Estimates Furnished on any kind of Work in Connection with Gas or Water Plants.

SPECIAL ATTENTION GIVEN TO THE REMODELLING AND EXTENDING OF THE PROPERTIES OF WORKS NOT UP-TO-DATE.

CORRESPONDENCE SOLICITED.

GEROULD'S IMPROVED RETORT CEMENT.

A Cement of great value for patching retorts, putting on mouthpieces, making up all bench-work joints, lining blast furnaces and cupolas. This cement is mixed ready for use. Economic and thorough in its work. Fully warranted to stick.

Price List, f.o.b. PITTSBURGH, PA.

In Casks, 400 to 800 pounds, at 5 cents per pound.
In Kegs, 100 to 200 " " 6 " "
In Kegs less than 100 " " 7 " "

C. L. GEROULD,

1200 Bank for Savings Bldg., Pittsburgh, Pa.

PERFECT GAS MAIN STOPPERS.

Simplest, Easiest, Best.

Cannot Slip.

EDWARD A. BEHRINGER, SOLE MANUFACTURER, 82 Warren Street, New York City.

Established 1851. Incorporated 1880.

THE STACEY MANUFACTURING CO.,

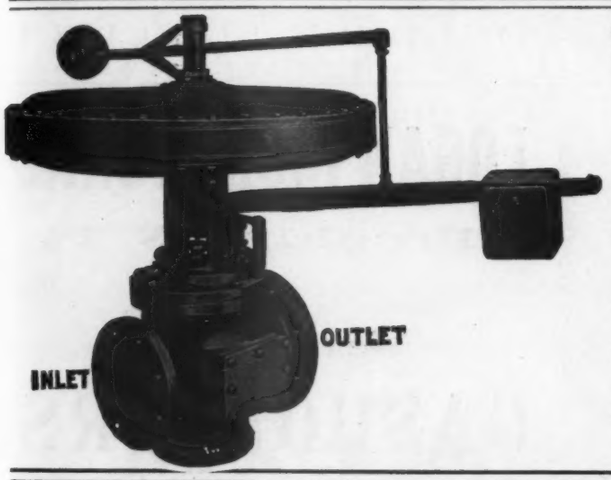
Engineers and Builders of Gas Works

GAS HOLDERS

All Ironwork and Apparatus required in a Gas Plant.

Executive Office and Works, - - - - - - - Station P, Cincinnati.
Western Office, - - - - - - - - 519 Eddy Street, San Francisco.

Correspondence Solicited.



THE FULTON GAS PRESSURE GOVERNOR,

WITH AUTOMATIC SAFETY CUTOFF.

For Artificial or Natural Gas.
For District or Service Use.

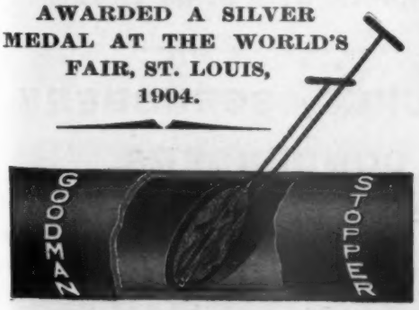
Our DUPLEX SENSITIVE GOVERNOR, with Automatic Cutoff for district service, will reduce high pressure gas to inches of water without variation.

Absolutely safe and reliable. No complicated mechanism to get out of order. More than 20 years' experience with the largest gas companies.

SEND FOR LATEST CATALOG.

THE CHAPLIN-FULTON MFG. CO.,
28-30 PENN AVENUE, PITTSBURGH, PA.

AWARDED A SILVER MEDAL AT THE WORLD'S FAIR, ST. LOUIS, 1904.



SAFETY GAS MAIN STOPPER CO.,

257-263 East 133d Street,
NEW YORK CITY.

PATENTS, TRADE MARKS, COPYRIGHTS.

ROYAL E. BURNHAM,
Solicitor of Patents and Counsellor in Patent Causes.
833 Bond Building, Washington, D. C.

Send for Pamphlet on Patents.

COAL TAR AND AMMONIA.

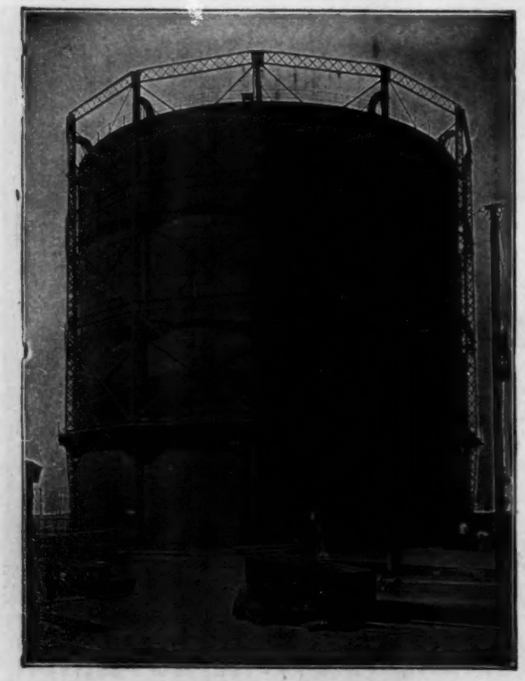
THIRD AND ENLARGED EDITION.

BY

GEORGE LUNGE, PH.D.

Price, $15. For Sale by

A. M. CALLENDER & CO., - - 42 Pine Street, New York City.



Deily & Fowler,

39 Laurel Street, Philadelphia, Pa.

(ESTABLISHED 1842),

BUILDERS OF

GASHOLDERS,

Single-Lift or Telescopic,

With or Without Steel Tanks.

Oil Storage Tanks, Water Tanks, Etc.

ESTIMATES CHEERFULLY FURNISHED.

CORRESPONDENCE SOLICITED.

The order for this Triple-Lift Holder and Steel Tank was received by the Logan Iron Works from the Union Gas Light Company, of East New York. The contract was completed and the Holder was in actual use in 90 days from receipt of order. Capacity of Holder, 500,000 cu. ft.

LOGAN IRON WORKS,

Brooklyn, N. Y.,

MANUFACTURERS OF

Single or Multiple-Lift

GASHOLDERS,

Complete, with Steel Tanks.

BENCHES, SCRUBBERS,
CONDENSERS,
PURIFIERS, IRON ROOFS,

AND ALL PARTS OF

GAS WORKS APPARATUS.

Contractors for
Complete Works.

FREDERIC EGNER,
Gas Engineer,
NORFOLK, VA.,

May be consulted with reference to estimates of cost for new, or appraising actual value of existing works; utility of proposed or patented processes; relative earning power to capitalization, and management.

GAS ANALYST'S MANUAL,
By JAQUES ABADY, M. Inst. Mech. E.
(Incorporating F. W. Hartley's "Gas Analyst's Manual" and "Gas Measurement.")
Ninety-three Illustrations and Nine Folding Plates. Bound in Handsome Half Leather. Price, $6.50
For Sale by A. M. CALLENDER & Co., 42 Pine St., New York City.

D. McDONALD & CO.,

971-997 BROADWAY, ALBANY, N. Y.,

MANUFACTURERS OF

DRY GAS METERS, STATION METERS, PREPAYMENT METERS, METER PROVERS AND GAUGES.

THE GLOVER PREPAYMENT METER,

Simple, Strong, Satisfactory.

THE HINMAN STATION METER DRUM,

The greatest advance that has been made in 20 years in the ACCURATE and ECONOMICAL measurement of gas in large quantities. :: :: ::

NEW YORK OFFICE: 561 West 47th Street. | ALBANY OFFICE: 991 Broadway. | CHICAGO OFFICE: Jefferson and Monroe Streets.

10 Reasons

for using
Westinghouse
Large Capacity "A"
Dry Gas Meters

Greater Capacity	Uniformity in Capacity
Greater Durability	Accessibility of Parts
Greater Economy	Minimum Repairs
Better Design	Superior Diaphragms
Stronger Construction	Low Cost.

We also make a full line of regular capacity meters and prepayment meters. Our Dry Gas Meter Catalogue tells all about them; send for a copy.

Pittsburg Meter Company

East Pittsburg, Pa.

BEST IN THE WORLD.

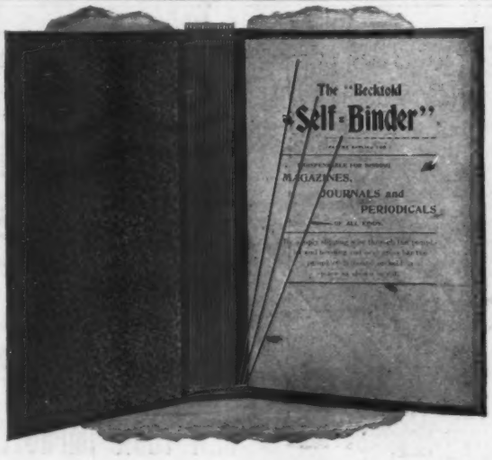
THAT MEANS THE

Humphrey Instantaneous Bath Water Heaters.

They should be used in every home, no matter whether there are other hot water arrangements or not. ∴ ∴ ∴ ∴ ∴ ∴ ∴

Handsome New Catalog No. 9 is Free. Shall we Send it? ∴ ∴

HUMPHREY CO.,
Kalamazoo, Mich., U. S. A.



Binder

FOR THE

Journal.

PRICE,

$1.

For Sale by

A. M. CALLENDER & CO.,

42 Pine Street, New York City.

NATHANIEL TUFTS METER COMPANY,

455 Commercial St., Boston, Mass.

PREPAYMENT GAS METERS,
WET AND DRY GAS METERS, STATION METERS, ETC.

REPAIRING OF ALL MAKES OF METERS, AND FITTED WITH OUR PREPAYMENT ATTACHMENT.

B

METERS.

INCREASED CAPACITY.
INCREASED EFFICIENCY.

PREPAYMENT METERS, STATION METERS, METER PROVERS, ETC.

PROMPT AND CAREFUL ATTENTION TO ALL REPAIR WORK.

MARYLAND METER COMPANY,

BALTIMORE.—CHICAGO.

YOU NEED ONE OR MORE OF OUR COMPLAINT METERS.

METERS, Plain and Prepayment,

For Artificial or Natural Gas.

Repairing All Makes and Attachments Added if Desired.

SPECIAL METERS FOR ACETYLENE.

KEYSTONE METER COMPANY,

ROYERSFORD, PA.

JUDICIOUS ECONOMY IS EFFECTED

BY USING

5-L. IMPROVED GAS METERS.

LOW SPEED, LARGE DIAPHRAGMS,
STRONGER CONSTRUCTION.
LARGER CAPACITY.

FITTED WITH

THE NEW YORK PREPAYMENT ATTACHMENT.
STEEL BOX AND CABINET LOCK. :: :: ::

NEW YORK IMPROVED METER CO., 306-310 East 47th St., New York City.

AMERICAN METER CO.,

NEW YORK, ST. LOUIS, PHILADELPHIA, SAN FRANCISCO, CHICAGO,

Wet and Dry Gas Meters, Station Meters, Meter Provers, Photometrical Apparatus, Gauges,

PREPAYMENT METERS,

REGULAR METERS REFITTED WITH PREPAYMENT ATTACHMENTS.

HELME & McILHENNY,

Established 1848. **1339 to 1349 Cherry Street, Philadelphia, Pa.**

MANUFACTURERS OF

Wet and Dry Gas Meters, Station Meters, Provers, Gauges, Etc.

METERS REPAIRED

PREPAYMENT GAS METERS.

Our Own Patents. Strong. Simple. PROMPT ATTENTION. CORRESPONDENCE SOLICITED.

METRIC METAL COMPANY,

MAKERS OF

GAS METERS for NATURAL and ARTIFICIAL GAS.

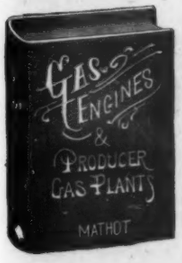
Special Attention given to Repairing METERS of all Makes.

FACTORY AT ERIE, PA.

MODERN GAS ENGINES and PRODUCER GAS PLANTS,

By R. MATHOT, M.E.,

Containing a Preface by DUGALD CLERK, F.C.S., Indorsing the Book.



A PRACTICAL Treatise of 320 pages, Fully Illustrated by 175 Detail Illustrations, Setting Forth the Principles of Gas Engines and Producer Design, the Selection and Installation of an Engine, Conditions of Perfect Operation, Producer Gas Engines and their Possibilities, the Care of Gas Engines and Producer Gas Plants, with a Chapter on Volatile Hydrocarbons and Oil Engines.

Price, $2.50. For Sale by

A. M. CALLENDER & CO., - 42 Pine Street, New York City.

JOHN J. GRIFFIN & CO.,

1513 TO 1521 RACE STREET,
PHILADELPHIA.

559 West 47th Street,
NEW YORK.

Jefferson and Monroe Streets,
CHICAGO.

GAS METERS,

Station Meters and Apparatus of Every Description.

REPAIRING CAREFULLY DONE.

THE POSITIVE PREPAYMENT METER.

500,000 OF THESE PREPAYMENT METERS ARE IN USE IN THE UNITED STATES, AND THE DEMAND IS STEADILY INCREASING.

If you have some ordinary meters to be repaired, send them to us and let us repair and convert them into prepayment meters. They will be a source of satisfaction and profit to you.

SEND FOR OUR CATALOGUE AND OUR PREPAYMENT BOOKLET.